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A National Cancer Institute-designated Comprehensive Cancer Center | A National Comprehensive Cancer Network Member
Blue Distinction Center for Complex and Rare Cancers® | Blue Distinction Center for Transplants® | An ANCC Magnet®-Designated Hospital

ROSWELL PARK CANCER INSTITUTE

Quality 2014



Dr. Candace S. Johnson - President and CEO



Candace S. Johnson, PhD
President and CEO
Cancer Center Director
Chair, Pharmacology and Therapeutics
Wallace Chair in Translational Research

Dear Colleague,

On behalf of Roswell Park Cancer Institute, I am pleased to share our latest outcomes report, *Quality 2014*. As healthcare providers and consumers, we at Roswell Park believe that the best, most direct way of earning the trust and confidence of our patients and the physicians who refer them to us is through applying evidence-based best practices and continually reviewing, measuring and sharing our outcomes in the most transparent way possible.

Delivering quality healthcare is a skill that is learned in training and honed with years of dedication and experience. Our physicians are nationally and internationally renowned for their expertise and contributions to cancer research and the formulation of best practices. We hope you will find the information in this book to be valuable and objective evidence of the quality care we provide to our patients who inspire us daily in our mission to understand, prevent and cure cancer.

Thank you for your continued support,



Dr. Boris Kuvshinoff - Chief Medical Quality Officer



Boris Kuvshinoff II, MD, MBA
Chief Medical Quality Officer
Associate Professor, Division of
Gastrointestinal/Endocrine Surgery
Department of Surgical Oncology
Director, Liver and Pancreas Tumor Center

Dear Colleague,

Roswell Park Cancer Institute's outcomes report, *Quality 2014*, is designed so that referring physicians can better see and understand Roswell Park's outcomes across the full continuum of care. In the pages to follow we are proud to share our key data about RPCI's patient-centered care and clinical trends – our strengths in addition to areas that need improvement. Our physicians, nurses and clinical support staff continue this pursuit of providing the highest quality, most efficient cancer care, and here in the numbers themselves, you'll see this pursuit expressed.

This is the second time that RPCI has published an extensive outcomes report, and I assure you it won't be our last. If you have any questions on the data presented here, please contact me at Boris.Kuvshinoff@roswellpark.org. For additional copies of this book, call 1-877-ASK-RPCI (1-877-275-7724) or send an email, with your name and address, to ASKRPCI@roswellpark.org.

Sincerely,



Survival Outcomes Data:

Patient survival outcomes presented in this publication have been compared to national statistics. Roswell Park Cancer Institute concurs that there are many challenges to interpreting survival data at face value, and comparisons do not necessarily reflect superiority of one cancer center over another. When possible, outcomes measures include reference to publicly available sources for comparison, such as the Surveillance, Epidemiology, and End Results (SEER) program of the National Cancer Institute (NCI) (seer.cancer.gov). Inclusion of these references does not, and is not intended to, represent controlled, direct comparisons.

RPCI data in this report have been benchmarked against data collected by the following sources:

Surveillance, Epidemiology, and End Results

The SEER program of the NCI collects and provides information on cancer incidence, prevalence, mortality and survival from specific geographic areas representing 28% of the U.S. population. Data are available from 1975 through 2007.

The National Cancer Data Base (NCDB)

Established by the American Cancer Society (ACS) and the American College of Surgeons Commission on Cancer (CoC), the NCDB is an oncology data set that currently captures 70% of all newly diagnosed cancer cases in the United States annually, and stores information on more than 30 million cases of reported cancer diagnoses from 1985 through 2002. Data collected include patient characteristics, tumor staging and histology characteristics, type of first-course treatment administered, disease recurrence, and survival information.

Press Ganey

Press Ganey is the industry's recognized leader in healthcare performance improvement, working with more than 10,000 healthcare organizations nationwide, including 50% of all U.S. hospitals, to improve clinical and business outcomes.

The National Comprehensive Cancer Network (NCCN)

The NCCN, a not-for-profit alliance of 25 of the world's leading cancer centers, promotes the importance of continuous quality improvement and recognizes the significance of creating clinical practice guidelines appropriate for use by patients, clinicians and other healthcare decision-makers. The primary goal of all NCCN initiatives is to improve the quality, effectiveness and efficiency of oncology practice so patients can live better lives.

The National Surgical Quality Improvement Project (NSQIP)

NSQIP was developed by the American College of Surgeons to decrease patient complications and improve outcomes following surgery. The program is standardized nationally using a validated sampling methodology. Certified Surgical Clinical Reviewers abstract program-defined surgical cases that return risk-adjusted outcomes data. In this manner, the program provides data that can be trusted to adjust for variables in a patient's preoperative condition and the type of surgery performed. Surgical outcomes are benchmarked against hundreds of other hospitals nationally and the results are used to develop performance improvement strategies to enhance the quality of surgical care.

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From its inception, RPCI's mission – to understand, prevent and cure cancer – has remained consistent with the vision of its founder, Dr. Roswell Park. Dr. Park intended 100% of the Institute's resources be devoted to this mission. RPCI was among the first to be designated a Comprehensive Cancer Center by the National Cancer Institute (NCI) in 1974, and it has held that distinction, without interruption, to the present.



HISTORICAL FIRSTS

- › America's first cancer center (1898).
- › Developed the world's first chemotherapy research program.
- › Pioneered the prostate specific antigen (PSA) test.
- › Pioneered photodynamic therapy (PDT).
- › Pioneered 5-FU and Leucovorin Therapy, the gold standard chemotherapy for colorectal cancer for many years.
- › Established one of the nation's first long-term survivors clinics for childhood cancer patients.
- › Made significant contributions to the landmark Human Genome project.

The Institute is also a charter member of the prestigious National Comprehensive Cancer Network (NCCN), an alliance of the nation's leading cancer centers. Many RPCI faculty serve on the NCCN panels that create the Clinical Practice Guidelines in Oncology™ – the internationally recognized standards for clinical policy in oncology, and the most comprehensive, most frequently updated clinical practice guidelines available in any area of medicine.

Statistics at a Glance (2007-2013)

| OUTPATIENT VISITS | | INPATIENT ADMISSIONS | |
|-------------------|-----------|----------------------|--------|
| CY | Total | CY | Total |
| 2007 | 174,756 | 2007 | 4,489 |
| 2008 | 180,214 | 2008 | 4,574 |
| 2009 | 193,661 | 2009 | 4,866 |
| 2010 | 200,204 | 2010 | 5,070 |
| 2011 | 201,465 | 2011 | 5,360 |
| 2012 | 205,622 | 2012 | 5,391 |
| 2013 | 202,716 | 2013 | 4,787 |
| Total | 1,358,638 | Total | 34,537 |

| CHEMO & INFUSION VISITS | | RADIATION VISITS | |
|-------------------------|---------|------------------|---------|
| CY | Total | CY | Total |
| 2007 | 33,269 | 2007 | 32,443 |
| 2008 | 35,463 | 2008 | 30,254 |
| 2009 | 36,503 | 2009 | 32,947 |
| 2010 | 38,146 | 2010 | 33,189 |
| 2011 | 38,393 | 2011 | 33,085 |
| 2012 | 38,452 | 2012 | 32,360 |
| 2013 | 38,839 | 2013 | 29,952 |
| Total | 259,065 | Total | 224,230 |

| SURGERY - OR CASES & ENDOSCOPY CASES | | |
|--------------------------------------|----------|-----------------|
| CY | OR CASES | ENDOSCOPY CASES |
| 2007 | 3,210 | 1,270 |
| 2008 | 4,379 | 1,766 |
| 2009 | 4,655 | 1,834 |
| 2010 | 4,734 | 2,037 |
| 2011 | 4,947 | 2,063 |
| 2012 | 5,077 | 2,446 |
| 2013 | 4,942 | 2,833 |
| Total | 31,944 | 14,249 |

Vital Statistics-2014

3,227 EMPLOYEES
309 FACULTY MEMBERS
612 NURSES
4,688 HOSPITAL ADMISSIONS
199,960 OUTPATIENT VISITS
31,143 PATIENTS UNDER ACTIVE CARE
PATIENT ORIGIN:
39 STATES
2 FOREIGN COUNTRIES
133 BEDS
AVERAGE LENGTH OF STAY: **8.2 days**
\$93M IN GRANTS/ CONTRACTS (PER ANNUM)
532 FUNDED RESEARCH PROJECTS
89 LICENSE AGREEMENTS
62 U.S. PATENTS

The RPCI Report Card

Roswell Park Cancer Institute's **Quality Improvement Program** ensures the provision of high-quality, cost-effective patient care. At RPCI, care and service systems are most effectively improved by continuously assessing and analyzing the structure, function and outcomes of these systems and using those data to indicate appropriate plans of correction.

NATIONAL DESIGNATIONS, ACCREDITATIONS

Forty-one facilities nationwide are designated comprehensive cancer centers by the **National Cancer Institute (NCI)**, highlighting scientific excellence and the ability to integrate a diversity of research approaches to focus on reducing morbidity and mortality from cancer. RPCI was one of the original cancer centers designated by the NCI as a comprehensive cancer center.

RPCI is a charter member of the **National Comprehensive Cancer Network (NCCN)**, an alliance of leading cancer centers that brings together the best minds in science to engineer continuous quality improvements in cancer care, offer access to the most promising clinical trials, and provide best-practice guidelines and measurement tools. RPCI faculty members serve on NCCN panels that develop the guidelines that specify the best ways to detect and treat cancer.

BlueCross BlueShield's Blue Distinction designations for specialty care are conferred based on a healthcare facility's evidence-based quality measures, processes and aggregate outcomes for clinical care. RPCI is a Blue Distinction Center for Complex and Rare Cancers as well as for Transplants (bone marrow and stem cell).

Only 6% of all hospitals in the United States earn **Magnet® Recognition for Nursing Excellence**, a designation from the American Nurses Credentialing Center that recognizes quality patient care, nursing excellence and innovations in professional nursing practice. RPCI received its recognition in 2010.

Foundation for the Accreditation of Cellular Therapy (FACT) promotes high-quality patient care and laboratory performance. RPCI is an accredited facility, having met the rigorous standards as defined by leading experts in the field.

Société Internationale d'Urologie conferred its first accreditation in robot-assisted surgical training to RPCI in 2011. This international accreditation allows RPCI to provide three-month fellowships focusing on laparoscopic and robot-assisted skills development and case observation to promising physicians early in their careers.

Association for the Accreditation of Human Research Protection Programs, Inc. (AAHRPP) accredits high-quality human research protection programs that promote excellent, ethically sound, safe research. RPCI is fully accredited.

PARTNERS IN QUALITY

Roswell Park Cancer Institute participates in, and has been recognized by, several programs that evaluate, track and share data to improve the quality and safety of cancer care. Such programs are detailed below.

Joint Commission's Gold Seal of Approval™ for meeting rigorous quality and safety standards. Hospitals that regularly monitor and track their performance of National Patient Safety Goals deliver safer, higher-quality healthcare. RPCI maintains high compliance (90%-100%) in all areas.

Since 1931, RPCI has been a participant in the **American College of Surgeons Commission on Cancer**, a national program that approves clinical programs at 1,500 hospitals nationwide.

The **Comprehensive Cancer Center Consortium for Quality Improvement (C4QI)** establishes common benchmarks by which cancer centers can compare themselves to each other. RPCI has been a C4QI member since 1997.

National Database of Nursing Quality Indicators, a proprietary database of the American Nurses Association, collects and evaluates unit-specific, nurse-sensitive data from hospitals, tracking information on patient falls, pressure ulcers, pain management, restraint use, staff mix, nursing care hours per patient day, and RN education and certification. RPCI has been a member since 2004.

Pay for Performance is a payment model that rewards healthcare providers who have better outcomes and hospitals that meet certain performance measures for quality and efficiency. RPCI has been a national leader in Pay for Performance Quality Initiatives since 2003.

More than one-third of U.S. hospitals currently use **Press Ganey**, which maintains a national database for benchmarking purposes, for patient-satisfaction measurement and improvement services. RPCI has been using Press Ganey for patient satisfaction benchmarking since 2002, and RPCI's most recent Overall Patient Satisfaction Score placed it in the 97th percentile nationwide.

VHA, Inc. (Voluntary Hospital Association) is dedicated to the success of healthcare by delivering industry-leading supply-chain management services and facilitating the development of networks that bring members together to solve key clinical and operational challenges. VHA's clinical performance-improvement programs are designed to extend an organization's knowledge, processes and resources, driving sustainable results. RPCI has been involved in the Transformation of the ICU and Transformation of the Operating Room clinical performance-improvement projects.

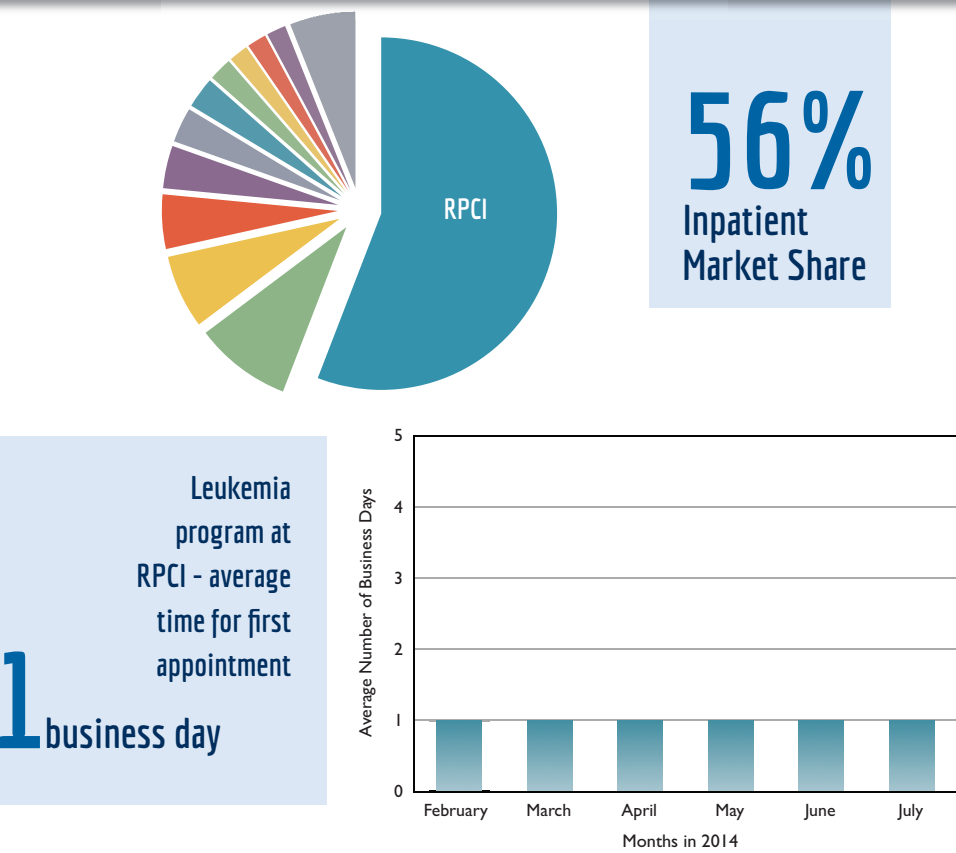
LEUKEMIA

Introduction

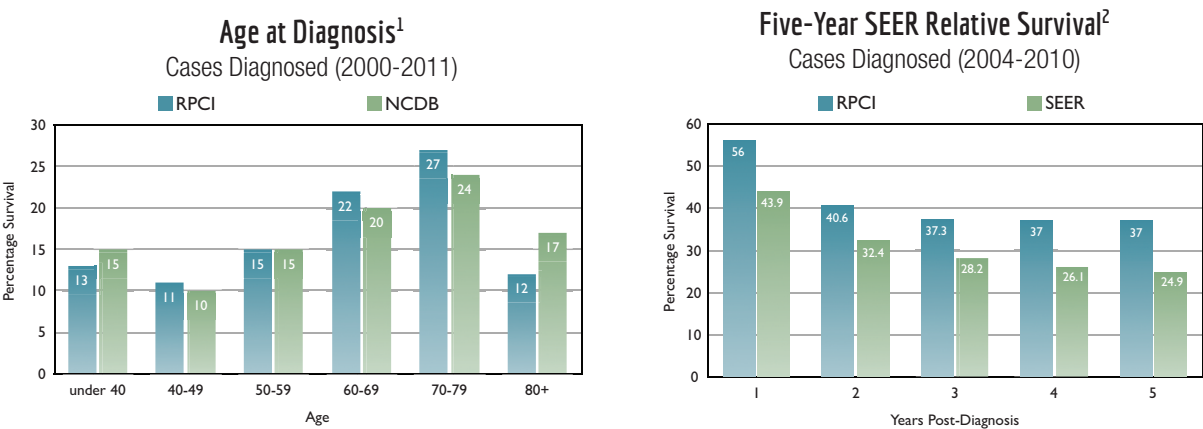
The Leukemia Service of RPCI's Department of Medicine is dedicated to quality patient care, innovative research, and development of more effective treatments for all types of leukemia. RPCI is the only cancer center that provides specialty care to leukemia patients in Western New York. Clinical research conducted by RPCI faculty and staff consistently translates into new leukemia therapies and advances overall knowledge of the disease. Clinical studies cover acute myeloid leukemia, acute lymphoblastic leukemia, chronic myeloid leukemia, myelodysplastic syndrome, and myeloproliferative diseases.

RPCI's leukemia program evaluates more than 300 new patients annually, resulting in over 6,500 chemotherapy visits per year. The information in the graph below provides WNY inpatient market share data based on NYS SPARCS data. It shows that Roswell Park Cancer Institute treated 56 percent of all WNY cases in 2012.

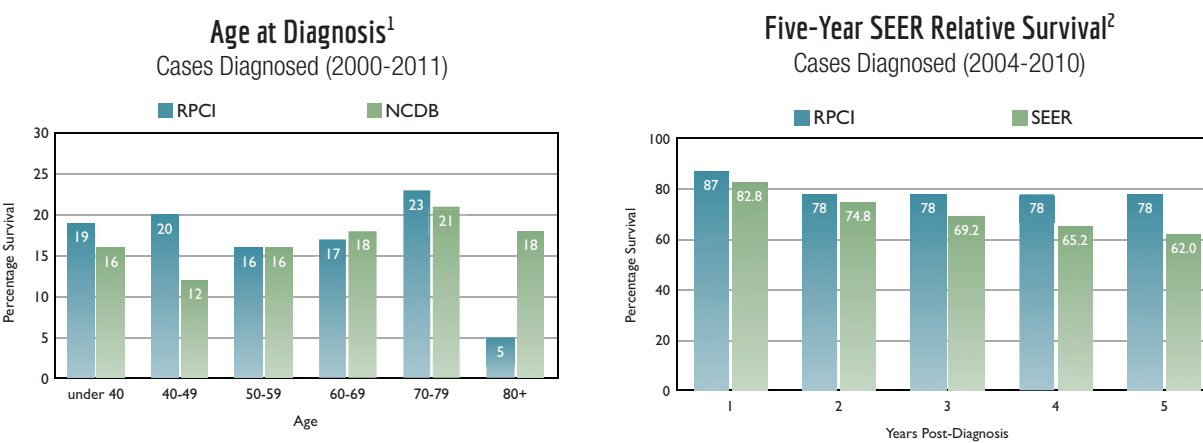
CY 2012 Inpatient Market Share by Hospital - LEUKEMIA



Acute Myeloid Leukemia (AML)



Chronic Myeloid Leukemia (CML)



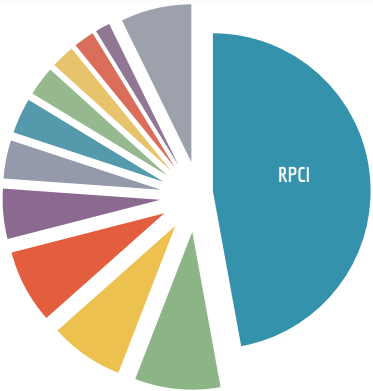
Data source:
¹National Cancer Data Base (NCDB), Commission on Cancer (CoC) of American College of Surgeons (ACoS)
²Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

LYMPHOMA

Introduction

RPCI's Lymphoma Program provides comprehensive care for over 500 new patients a year, resulting in 8,000 outpatient visits and 7,000 chemotherapy visits annually. The information in the graph below provides WNY inpatient market share data based on NYS SPARCS data. It shows that Roswell Park Cancer Institute treated 47 percent of all WNY cases requiring a hospital stay in 2012.

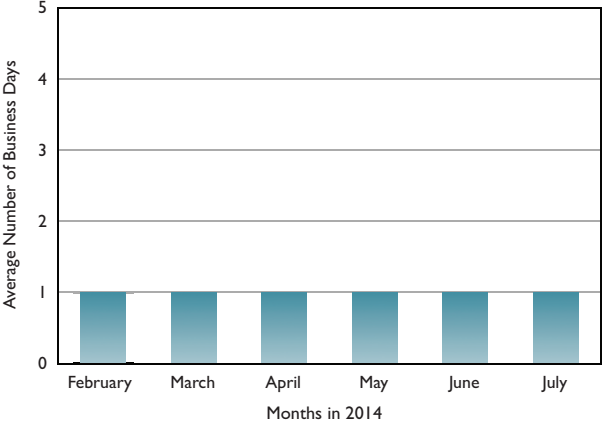
CY 2012 Inpatient Market Share by Hospital - LYMPHOMA



47%
Inpatient
Market Share

Lymphoma
program at
RPCI - average
time for first
appointment

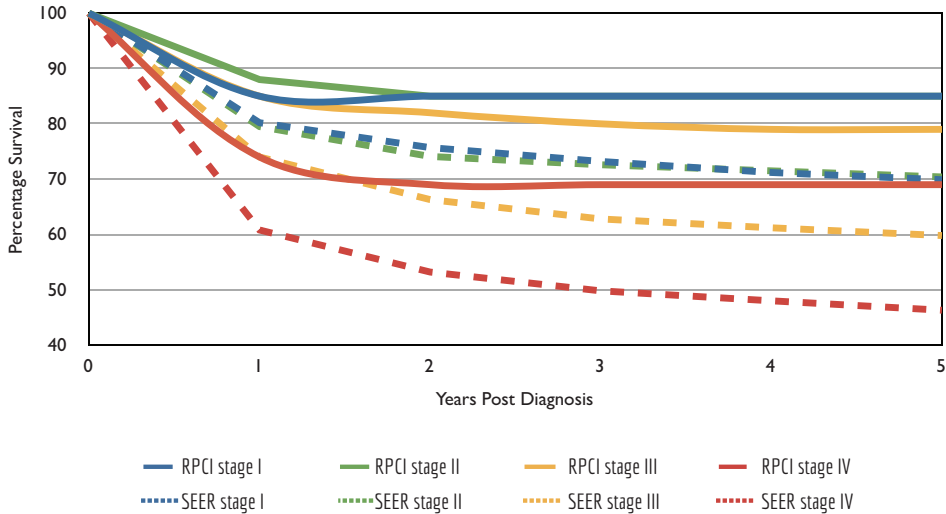
1 business day



Non-Hodgkin Lymphoma (NHL)—Diffuse Large B-Cell Lymphoma

The two main forms of lymphoma are Hodgkin and Non-Hodgkin Lymphoma (NHL). Diffuse Large B-Cell Lymphoma (DLBCL) is the most common form of NHL, accounting for up to 30 percent of newly diagnosed patients in the United States. Diffuse large B-cell grows and spreads aggressively and requires immediate treatment. Treatment includes chemotherapy along with rituximab, a monoclonal anti-B cell therapy with or without radiation to treat DLBCL. The graph below shows the survival data for RPCI patients diagnosed between 2004-2010:

Five-Year Relative Survival for Diffuse Large B-Cell Lymphoma
Cases Diagnosed (2004-2010)



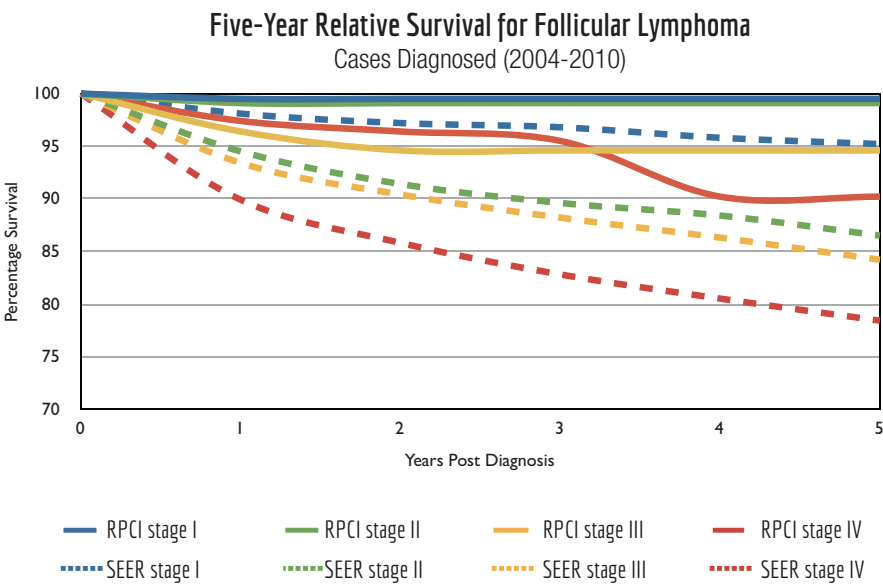
| | 0 | 1 | 2 | 3 | 4 | 5 |
|------------------------|------|--------|--------|--------|--------|--------|
| (n =108) RPCI stage I | 100% | 85% | 85% | 85% | 85% | 85% |
| (n =75) RPCI stage II | 100% | 88% | 85% | 85% | 85% | 85% |
| (n =70) RPCI stage III | 100% | 85% | 82% | 80% | 79% | 79% |
| (n =155) RPCI stage IV | 100% | 74% | 69% | 69% | 69% | 69% |
| SEER stage I | 100% | 80.20% | 75.70% | 73.20% | 71.20% | 69.90% |
| SEER stage II | 100% | 79.50% | 74.10% | 72.60% | 71.50% | 70.40% |
| SEER Stage III | 100% | 74% | 66.30% | 62.80% | 61.20% | 59.80% |
| SEER stage IV | 100% | 60.80% | 53.20% | 49.80% | 48% | 46.30% |

American Joint Commission on Cancer (AJCC) Stage I-IV Non-Hodgkin Lymphoma

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

Non-Hodgkin Lymphoma (NHL)–Follicular Lymphoma

Follicular lymphoma is a common type of NHL. It is also called *indolent lymphoma*, as it spreads and grows at a slower pace. The average age at diagnosis is about 55. The graph below shows the survival data for RPCI patients diagnosed between 2004-2010:



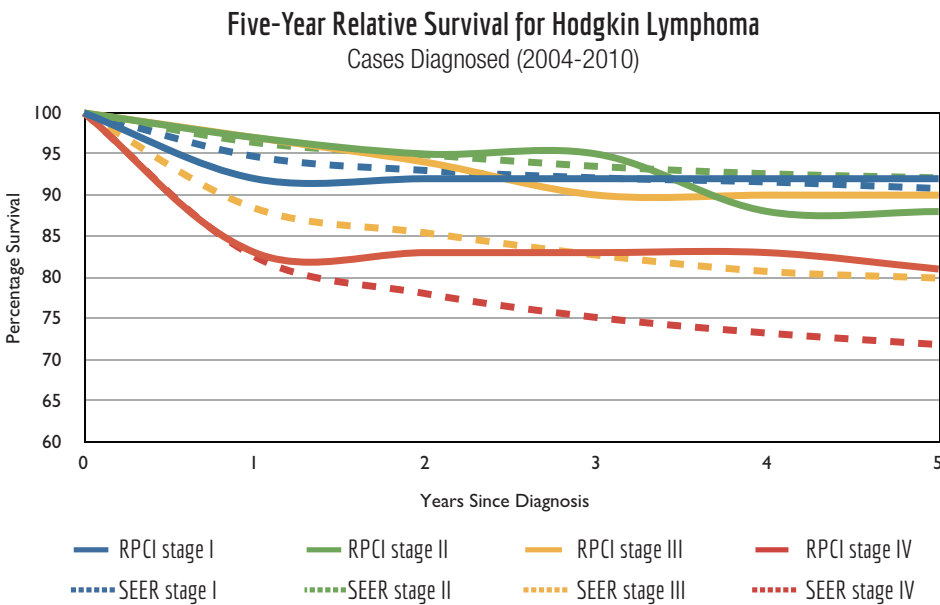
| | | 0 | 1 | 2 | 3 | 4 | 5 |
|---------|----------------|------|--------|--------|--------|--------|--------|
| (n =45) | RPCI stage I | 100% | 99.50% | 99.50% | 99.50% | 99.50% | 99.50% |
| (n =34) | RPCI stage II | 100% | 99.10% | 99.10% | 99.10% | 99.10% | 99.10% |
| (n =92) | RPCI stage III | 100% | 96.40% | 94.60% | 94.60% | 94.60% | 94.60% |
| (n =71) | RPCI stage IV | 100% | 97.40% | 96.40% | 95.50% | 90.20% | 90.20% |
| | SEER stage I | 100% | 98.10% | 97.20% | 96.80% | 95.80% | 95.20% |
| | SEER stage II | 100% | 94.50% | 91.40% | 89.60% | 88.40% | 86.50% |
| | SEER Stage III | 100% | 93.40% | 90.40% | 88.20% | 86.30% | 84.20% |
| | SEER stage IV | 100% | 89.90% | 85.80% | 82.80% | 80.50% | 78.40% |

American Joint Commission on Cancer (AJCC) Stage I-IV follicular lymphoma

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

Hodgkin Lymphoma

Roswell Park has a multidisciplinary team to treat patients diagnosed with Hodgkin Lymphoma.



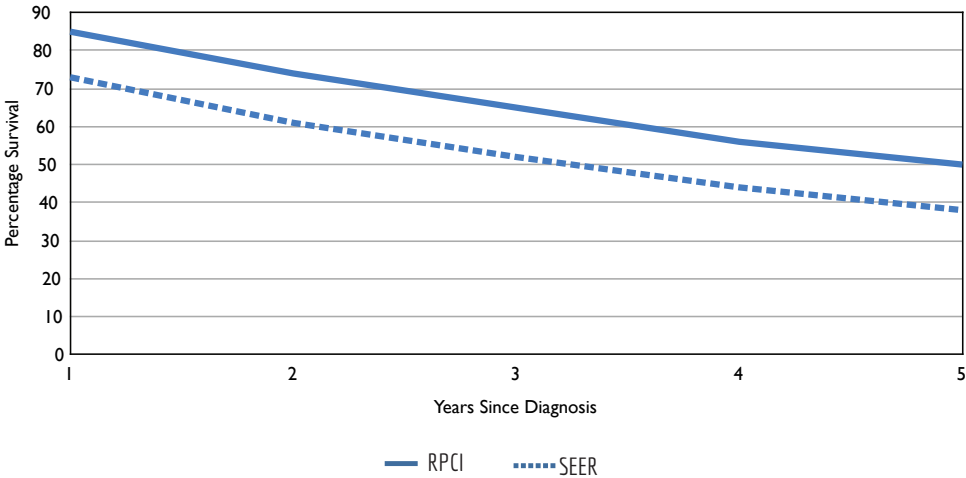
| | | 0 | 1 | 2 | 3 | 4 | 5 |
|---------|----------------|------|--------|--------|--------|--------|--------|
| (n =20) | RPCI stage I | 100% | 92% | 92% | 92% | 92% | 92% |
| (n =78) | RPCI stage II | 100% | 97% | 95% | 95% | 88% | 88% |
| (n =49) | RPCI stage III | 100% | 97% | 94% | 90% | 90% | 90% |
| (n =35) | RPCI stage IV | 100% | 83% | 83% | 83% | 83% | 81% |
| | SEER stage I | 100% | 94.70% | 93% | 92.10% | 91.60% | 90.80% |
| | SEER stage II | 100% | 96.40% | 94.90% | 93.50% | 92.60% | 92.10% |
| | SEER Stage III | 100% | 88.40% | 85.40% | 82.70% | 80.70% | 79.90% |
| | SEER stage IV | 100% | 82.50% | 78% | 75.10% | 73.20% | 71.80% |

American Joint Commission on Cancer (AJCC) Stage I-IV Hodgkin Lymphoma

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

Multiple Myeloma

Five-Year Relative Survival for Multiple Myeloma
Cases Diagnosed (2004-2010)



(n =289)

| | 1 | 2 | 3 | 4 | 5 |
|------|-----|-----|-----|-----|-----|
| RPCI | 85% | 74% | 65% | 56% | 50% |
| SEER | 73% | 61% | 52% | 44% | 38% |

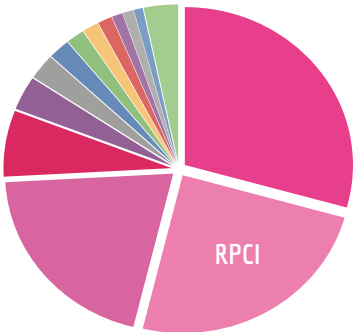
Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data - Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

BREAST

Introduction

The multidisciplinary Breast Program at RPCI provides comprehensive and integrated diagnostic and therapeutic options for our patients. We specialize in both benign and malignant breast disease with services ranging from cancer prevention and risk assessment through survivorship. We have subspecialty-trained, breast-specific experts on staff with the ability to provide all services on site. The dedication to evidence-based practice and quality improvement is a long-standing tradition in the Breast Center at RPCI and many members of our team serve on national committees for guidelines development, cooperative group research and quality evaluation. Our commitment to compassionate cancer care is evident in the time spent educating patients about their disease process.

CY 2012 Inpatient Market Share by Hospital - BREAST



25%
Inpatient
Market Share

Roswell Park Cancer Institute provides comprehensive care for over 1,000 new patients annually, resulting in over 600 procedures (including outpatient and inpatient), 4,000 chemotherapy visits, and 15,000 office visits with our care providers. The information in this section provides WNY inpatient market share data based on NYS SPARCS data. It shows that RPCI treated 25 percent of all WNY cases requiring hospital stays in 2012.

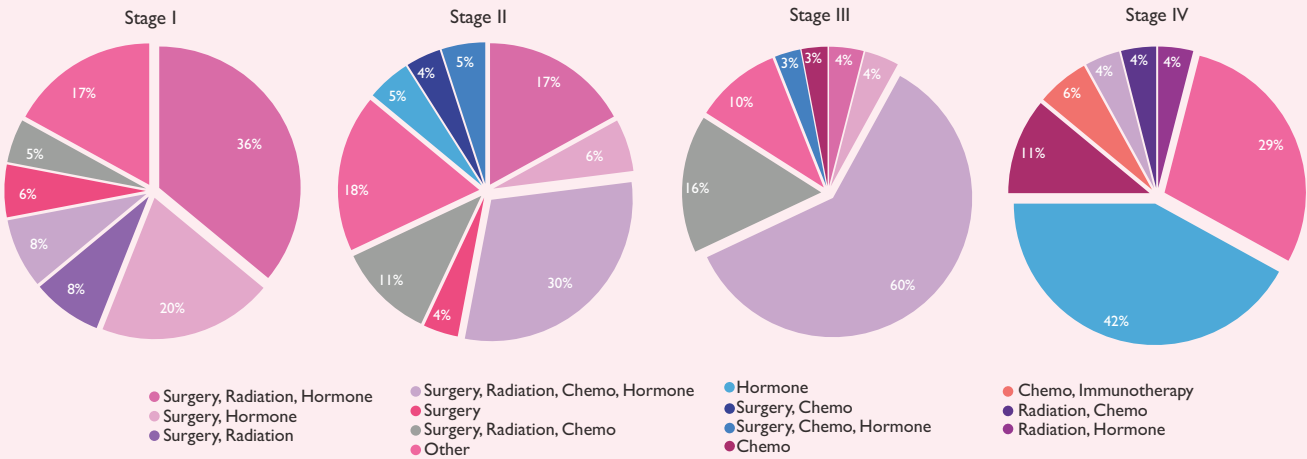
Treatment

Most women with breast cancer have multiple options for local, regional, and systemic management. In the Breast Center, the oncologists focus on patient education to provide individualized options. Nationally, breast conservation is encouraged when feasible. While mastectomy rates in the United States have been on the rise, RPCI's breast conservation rate for early stage breast cancer remains stable and slightly exceeds national trends.

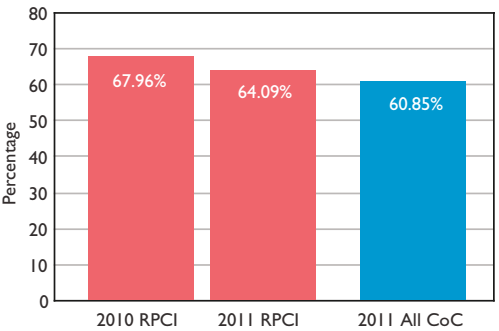
With the ability to provide onco-plastic techniques, breast conservation is sometimes possible even for stage III cancers. Our margin re-excision rate is lower than many published studies. We monitor our outcomes, including adherence to many quality measures, to ensure the most evidence-based treatment is considered. For those who require or opt for mastectomy, a wide range of reconstructive options is available in our Plastic and Reconstructive Surgery Department.

Scientific advances in the field of breast surgery are proceeding at an astonishing rate. Access to clinical trials opens treatment options that could profoundly affect patients. Participation in these multicenter clinical trials sometimes allows management strategies with decreased morbidity—for example, avoidance of axillary dissection, omission of certain chemotherapeutics, and alleviation of treatment-induced side effects. Patients are routinely evaluated for eligibility for clinical trials, and weekly multidisciplinary meetings are held to discuss all options.

Treatment Received by Breast Cancer Patients for Stages I-IV
Cases Diagnosed (2010-2011)



Breast-Conserving Surgery Rate (BCS)



The graph to the left shows Breast-Conserving Surgery Rate for RPCI Patients with Clinical or Pathological Stage 0, I, II compared with all Commission on Cancer (CoC)-accredited cancer programs nationwide.

Data source: ACOS, NCDB CQIP

Survival Data

Below are our five-year survival rates compared with SEER national estimates. The survival data for male and female breast cancers show that RPCI patients fare at least as well as, or better than, the national average.

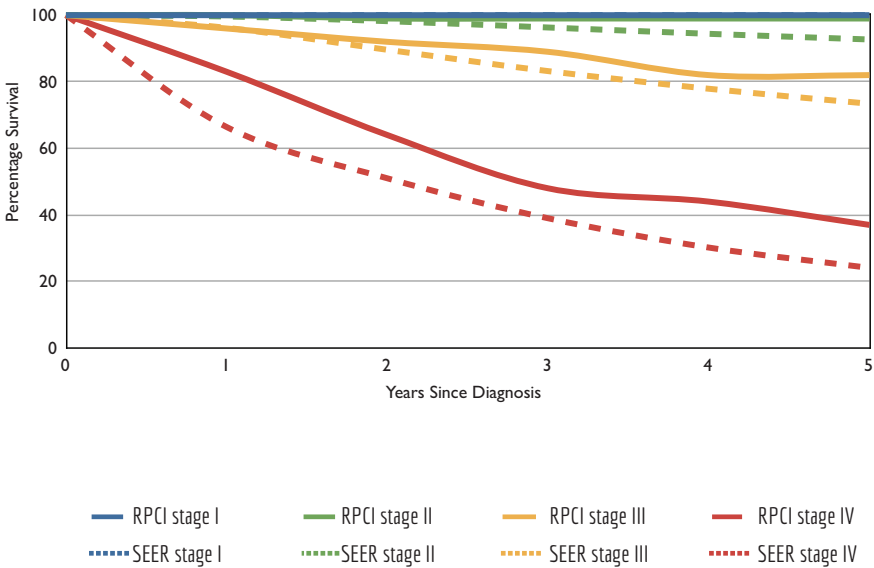
Five-Year Relative Survival of Males and Females, All Stages
Year of Diagnosis (2004-2010)



| | 0 | 1 | 2 | 3 | 4 | 5 |
|------|------|--------|--------|--------|--------|--------|
| RPCI | 100% | 99.10% | 98.20% | 98.20% | 98.20% | 98.20% |
| SEER | 100% | 97.30% | 95.10% | 92.70% | 90.80% | 89.20% |

Data source: Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

Five-Year Relative Survival of Patients with Breast Cancer by Stage
Cases Diagnosed (2004-2010)



| | | 0 | 1 | 2 | 3 | 4 | 5 |
|------------|----------------|------|--------|--------|--------|--------|--------|
| (n =1,361) | RPCI stage I | 100% | 100% | 100% | 100% | 100% | 100% |
| (n =877) | RPCI stage II | 100% | 100% | 99% | 99% | 99% | 99% |
| (n =348) | RPCI stage III | 100% | 96% | 92% | 89% | 82% | 82% |
| (n =177) | RPCI stage IV | 100% | 83% | 64% | 48% | 44% | 37% |
| | SEER stage I | 100% | 100% | 100% | 100% | 100% | 100% |
| | SEER stage II | 100% | 99.60% | 98.20% | 96.30% | 94.40% | 92.70% |
| | SEER Stage III | 100% | 96.20% | 89.60% | 83.20% | 77.90% | 73.40% |
| | SEER stage IV | 100% | 66.40% | 51.00% | 39.00% | 30.20% | 24.10% |

American Joint Commission on Cancer (AJCC) Stage I-IV breast cancer

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

Quality Data

Quality measures reviewed on every patient include specific measures approved by the National Quality Forum and measures developed from National Comprehensive Cancer Network (NCCN) Clinical Practice Guidelines. However, as with all quality measures, it is expected for many reasons (e.g., patient preference, medical contraindications), that concordance with a measure will never be 100%.

| Breast Cancer: NCCN Guidelines Compliance (2009-2013) | | | |
|--|--|--------------------------------------|--|
| Measure | Factors Affecting Care | RPCI | Impact |
| No axillary surgery with breast-conserving surgery for DCIS | Axillary surgery occasionally appropriate with high suspicion of invasion cancer | (2009-2013) 94% (2013 only) 98.6% | Decreased cost and morbidity |
| Percentage of cases with stage I & II; tumors 0-2 cm; under age 70; with axillary lymph node surgery | Limited to those under age 70 because axillary surgery over age 70 is optional with small cancer, per NCCN guidelines | (2009-2013) 100% | Improved staging, more accurate information for treatment planning |
| Radiation with breast-conserving surgery – stage I & II | Limited to women under age 70 because use of radiation over age 70 is optional with small cancers, per NCCN guidelines | (2009-2013) 96% | Decreased chance of cancer recurrence in the breast |

Comparison of Estimated Performance Rates for Breast Cancer Diagnosed for Years 2010, 2011, 2012

The performance rates below have been computed based on data directly reported from RPCI's Cancer Registry, and are compared to national benchmarks. Once again, the care of RPCI patients who did not receive treatment was carefully reviewed. Most notable is the second table showing chemotherapy in hormone-receptor-negative cancer. These cases were non-concordant for two reasons: a few patients decided not to undergo chemotherapy because of personal and medical reasons, and a number who received treatment did so just a few days outside the 120-day time window stipulated in the measure.

Combination chemotherapy is considered or administered within 4 months (120 days) of diagnosis for women under 70 with AJCC T1cN0M0, or stage II or III hormone receptor negative breast cancer.

| | 2010 | | | 2011 | | | 2012 | | |
|---------------------|------------------|-------------|-------|------------------|-------------|-------|------------------|-------------|-------|
| | Performance Rate | 95% CI | Cases | Performance Rate | 95% CI | Cases | Performance Rate | 95% CI | Cases |
| Roswell Park | 94.70% | 91.10-98.30 | 152 | 94.10% | 90.20-98.10 | 136 | 96.70% | 93.90-99.50 | 152 |
| New York | 89.40% | | 2749 | 84.80% | | 3789 | 77.80% | | 4183 |
| NCI Centers | 94.60% | | 1407 | 95.40% | | 1688 | 93.90% | | 1775 |
| All Programs (U.S.) | 92.80% | | 32055 | 92.40% | | 36437 | 90% | | 40331 |

Combination chemotherapy is considered or administered within 4 months (120 days) of diagnosis for women under 70 with AJCC T1cNOMO, or stage II or III hormone-receptor-negative breast cancer.

| | 2010 | | | 2011 | | | 2012 | | | 2013 | | |
|---------------------|-------------|-----------|-------|------------|-----------|-------|------------|-------------|-------|------------|-----------|-------|
| | *Perf. Rate | 95% CI | Cases | Perf. Rate | 95% CI | Cases | Perf. Rate | 95% CI | Cases | Perf. Rate | 95% CI | Cases |
| Roswell Park | 94.30% | 86.60-100 | 35 | 92.60% | 82.70-100 | 27 | 83.30% | 68.40-98.20 | 24 | 90.30% | 79.90-100 | 31 |
| New York | 84.10% | | 579 | 83.60% | | 860 | 79.80% | | 866 | 78.70% | | 815 |
| NCI Centers | 91.10% | | 383 | 89.50% | | 448 | 91.20% | | 455 | 94.80% | | 535 |
| All Programs (U.S.) | 92% | | 8476 | 91.40% | | 9041 | 89.10% | | 9677 | 89.10% | | 8782 |

*Performance Rate Rate

Tamoxifen or a third-generation aromatase inhibitor is considered or administered within 1 year (365 days) of diagnosis for women with AJCC T1cNOMO, or stage II or III hormone-receptor-positive breast cancer.

| | 2010 | | | 2011 | | | 2012 | | |
|---------------------|-------------|--------|-------|------------|-------------|-------|------------|-----------|-------|
| | *Perf. Rate | 95% CI | Cases | Perf. Rate | 95% CI | Cases | Perf. Rate | 95% CI | Cases |
| Roswell Park | 98.10% | 96-100 | 160 | 94.60% | 91.10-98.00 | 166 | 98% | 95.70-100 | 148 |
| New York | 89% | | 3400 | 87.40% | | 4394 | 71.40% | | 4987 |
| NCI Centers | 93.50% | | 1922 | 94.80% | | 2335 | 94% | | 2432 |
| All Programs (U.S.) | 89.90% | | 43238 | 90.60% | | 49004 | %86.50 | | 55447 |

*Performance Rate Rate

Research Studies and Quality Data (and Special Programs)

Breast Cancer Databases

Monitoring outcomes is one of the most important tasks of a cancer program. Quality improvement depends on tracking data, feedback to providers, and development of interventions to address any barriers to care. In the Breast Center, we work closely with the hospital’s tumor registry, a breast cancer outcomes database, and nationally available programs to ensure the patients we treat have at least comparable outcomes to other local, regional, and national centers.

A Safety Net

Quality of care measures, such as timely receipt of adjuvant therapies, are associated with improved cancer outcomes. RPCI participates in the Commission on Cancer’s Rapid Quality Reporting System (RQRS), which collects data for treatment monitoring in real time. This program tracks adherence to nationally set standards in breast cancer care and alerts the providers here if there is an impending lapse in concordant care. Daily alerts can prompt further investigation to ensure each individual patient receives, or at least considers, the appropriate treatment, and does not fall through the cracks.

High Risk for Breast Cancer

The Breast Center at RPCI provides services for women at high risk for breast cancer. In the Risk Assessment and Prevention Program, over 200 women each year are counseled and managed according to their risk status. While some may benefit from measures such as risk-reducing breast surgery, others require enhanced surveillance techniques such as breast MRI. Our high-risk program works alongside the High-Risk Ovarian Cancer Program and Clinical Genetics Services; this program is supported in part by the Buffalo Sabres Alumni Wives. Consultation is available for anyone who shows a high risk for breast cancer.

Research and Education

The breast specialists at RPCI are active investigators. This past year, Dr. Thaer Khoury published his work on atypical lesions of the breast, developing a predictive model for the likelihood of finding cancer when a woman is diagnosed with a high-risk lesion. Dr. Tracey O’Connor is continuing to investigate treatment options in elderly patients and minimizing the side effects of treatment. Dr. Shicha Kumar has presented recently on elderly women with breast cancer and avoiding excess treatment, and Dr. Mateuz Opyrchal is actively identifying mechanisms of chemotherapy resistance. Education is highlighted as well, with the presence of an ACGME-accredited surgical oncology fellowship and an SSO-accredited breast oncology fellowship. In educating tomorrow’s cancer doctors, we focus on outcomes and evidence-based practice.

Localization of Nonpalpable Breast Cancers

The Breast Center at RPCI has recently joined many other centers in its use of radioactive seed localization for nonpalpable breast cancers. Multiple studies have shown improved ease of localization and patient satisfaction with this technique.

Expanded Breast Screening

We have been expanding screening services for people without cancer, such as high-risk patients and RPCI employees. We plan to open screening to the general public in the next few years, which will be a tremendous opportunity to provide options for early diagnosis to the women of WNY.

ESOPHAGUS

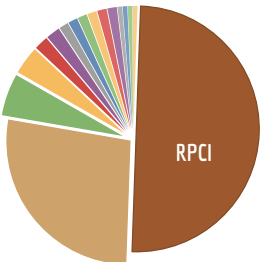
Introduction

Esophageal cancer is rare and complex, but at Roswell Park, we treat patients with this cancer every day. We believe every patient is unique, and our esophageal cancer experts approach cancer treatment on an individual and personal basis, treating the whole person, not just the cancer.

The BlueCross BlueShield Association recognizes Roswell Park as a Blue Distinction Center for Complex and Rare Cancers — including esophageal cancer. Only 90 cancer facilities in the nation have received this distinction for complex and rare cancers.

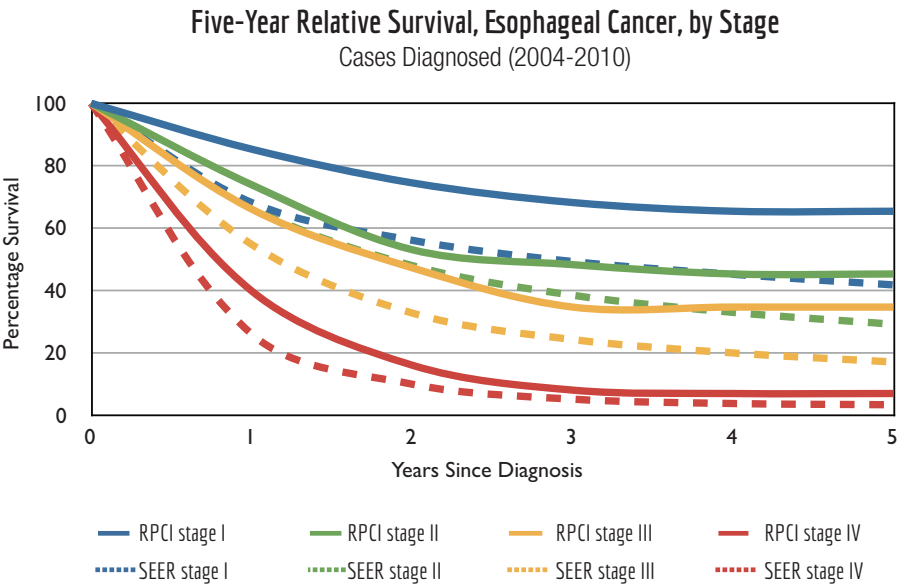
CY 2012 Inpatient Market Share by Hospital - ESOPHAGUS

The information in the graph below provides WNY inpatient market share data based on NYS SPARCS data. It shows that Roswell Park Cancer Institute treated 54 percent of all WNY cases requiring a hospital stay in 2012.



54%
Inpatient
Market Share

Survival Data



| | | 0 | 1 | 2 | 3 | 4 | 5 |
|----------|----------------|------|--------|--------|--------|--------|--------|
| (n =82) | RPCI stage I | 100% | 85.30% | 74.50% | 68.20% | 65.40% | 65.40% |
| (n =99) | RPCI stage II | 100% | 73.90% | 53.10% | 48.30% | 45.30% | 45.30% |
| (n =114) | RPCI stage III | 100% | 66.10% | 47.30% | 34.70% | 34.70% | 34.70% |
| (n =252) | RPCI stage IV | 100% | 39.90% | 16.10% | 8.10% | 7% | 7% |
| | SEER stage I | 100% | 68.20% | 56.10% | 49.30% | 45.20% | 41.80% |
| | SEER stage II | 100% | 66.50% | 48% | 38.50% | 33% | 29.20% |
| | SEER Stage III | 100% | 54.80% | 32.80% | 24.30% | 20% | 17.10% |
| | SEER stage IV | 100% | 26.10% | 10% | 5.20% | 3.80% | 3.40% |

American Joint Commission on Cancer (AJCC) Stage I-IV esophageal cancer

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

Quality

Roswell Park monitors esophagectomies and their outcomes using the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP®). The data in NSQIP includes and shows comparison on morbidity, mortality, and surgical site infections (SSI). Roswell Park has physician-led teams to monitor and improve these metrics.

| Esophagectomy | | | | | | | |
|------------------------|----------------------|----------------|------------------------|--------------------------------|----------|----------------|--------------------------------|
| Time Period | Procedures Reviewed* | Morbidity Rate | Morbidity Odds Ratio** | Odds Ratio Confidence Interval | SSI Rate | SSI Odds Ratio | Odds Ratio Confidence Interval |
| CY 2012 | 25 | 24% | 0.80 | 0.44-1.45 | 12% | 0.90 | 0.38-2.13 |
| CY 2013 | 26 | 34.62% | 0.99 | 0.54-1.81 | 11.54% | 0.78 | 0.33-1.87 |
| Goal/Target odds ratio | | | <=1.00 | | <=1.00 | | |

* The procedures reviewed are a small sample of total procedures performed.
** The odds ratio compares the results of one hospital to other hospitals participating in NSQIP. An odds ratio greater than 1.0 implies that the event is more likely, and if less than 1.0 it would be less likely to occur. The confidence interval (CI) tells us whether the odds ratio is statistically different from the other hospitals in NSQIP. If the confidence interval does not overlap 1.0, the outcome would be considered an outlier. Any confidence interval that includes 1.0 would be designated "as expected" by NSQIP.

Data Source:
American College of Surgeons (National Surgical Quality Improvement Program)

GASTROINTESTINAL

Introduction

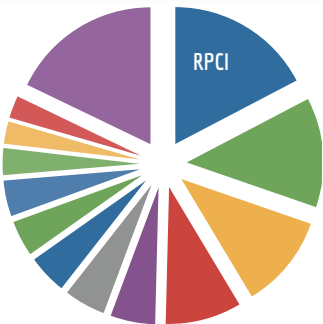
Roswell Park Cancer Institute takes a multidisciplinary approach to treating Gastrointestinal (GI) cancer patients. RPCI's GI Program includes colorectal, esophageal, liver, pancreatic, and stomach cancers. Annually RPCI's GI Program evaluates more than 3,000 new patients, resulting in 600 procedures (including inpatient and outpatient), 1,200 endoscopic procedures, over 6,000 infusions/chemo visits, and 17,000 office visits with our care providers.

COLORECTAL

CY 2012 Inpatient Market Share by Hospital - COLORECTAL

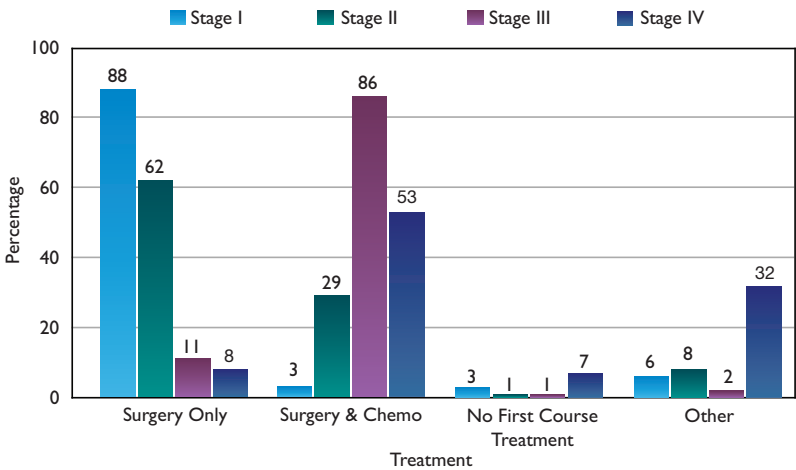
14%
Inpatient
Market Share

The information in the graph below provides WNY inpatient market share data based on NYS SPARCS data. It shows that Roswell Park Cancer Institute treated 14 percent of all WNY cases requiring hospital stays in 2012.



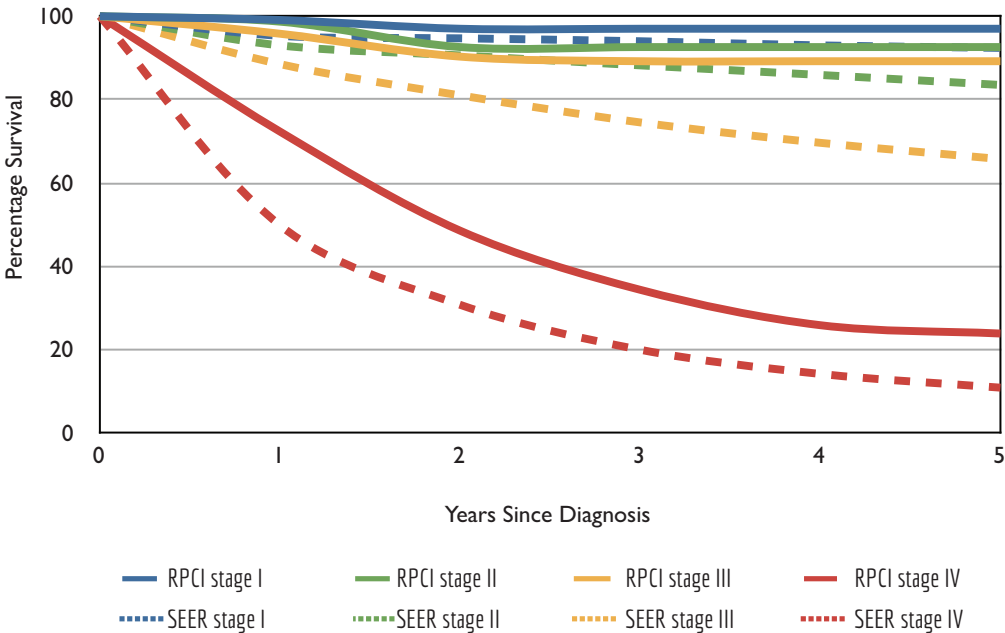
Treatment Received by Colorectal Patients

Colorectal Treatments Received for Stages I, II, III & IV
Cases Diagnosed (2002-2011)



Survival Data

Five-Year Relative Survival, Colorectal Cancer, Stages I, II, III & IV
Cases Diagnosed (2004-2010)



| | | 0 | 1 | 2 | 3 | 4 | 5 |
|----------|----------------|------|--------|--------|--------|--------|--------|
| (n =87) | RPCI stage I | 100% | 99.10% | 97% | 97% | 97% | 97% |
| (n =114) | RPCI stage II | 100% | 98.70% | 92.60% | 92.60% | 92.60% | 92.60% |
| (n =174) | RPCI stage III | 100% | 95.80% | 90.30% | 89.20% | 89.20% | 89.20% |
| (n =268) | RPCI stage IV | 100% | 72.30% | 48.50% | 34.30% | 25.80% | 23.80% |
| | SEER stage I | 100% | 95.30% | 94.70% | 94% | 93% | 92.40% |
| | SEER stage II | 100% | 93% | 90.60% | 88.20% | 85.90% | 83.50% |
| | SEER Stage III | 100% | 88.50% | 81% | 74.50% | 69.60% | 65.70% |
| | SEER stage IV | 100% | 49.80% | 30.70% | 19.90% | 14.10% | 10.80% |

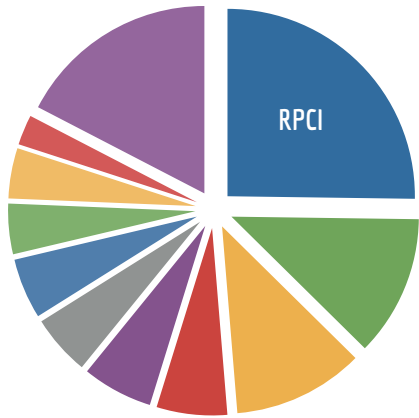
American Joint Commission on Cancer (AJCC) Stage I-IV colorectal cancer

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

STOMACH

CY 2012 Inpatient Market Share by Hospital - STOMACH

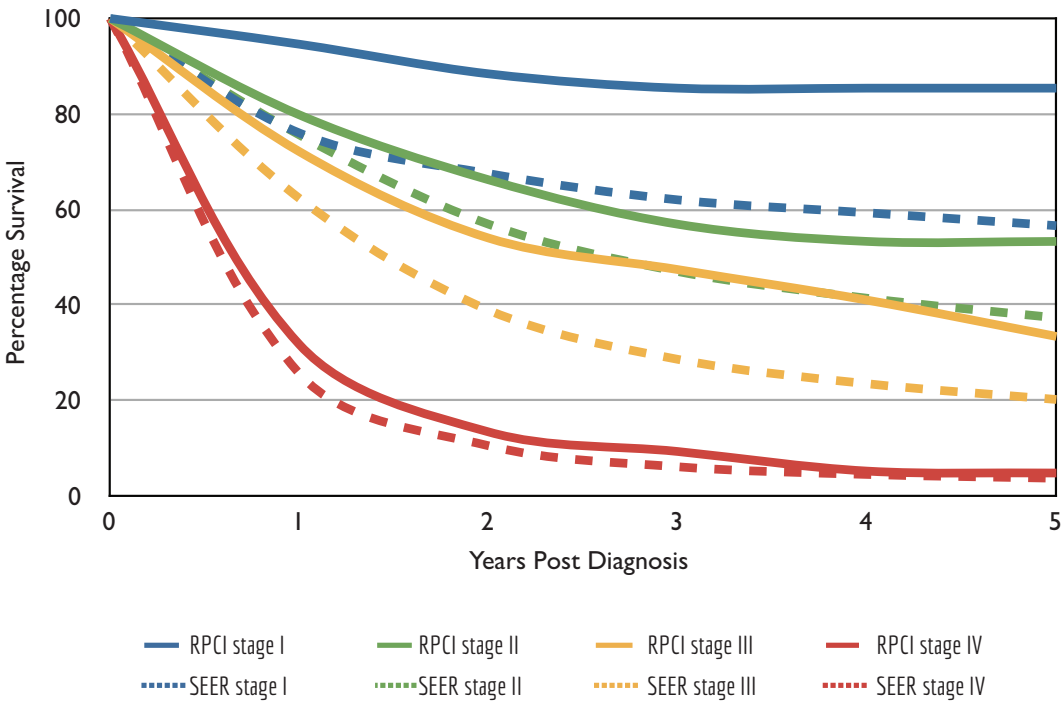
The information in the graph below provides WNY inpatient market share data based on NYS Inpatient SPARCS data. It shows that Roswell Park Cancer Institute treated 25 percent of all WNY cases requiring hospital stays in 2012.



25%
Inpatient
Market Share

Survival Data

Five-Year Survival, Stomach Cancer, Stages I, II, III & IV
Cases Diagnosed (2004-2010)



| | | 0 | 1 | 2 | 3 | 4 | 5 |
|----------|----------------|------|--------|--------|--------|--------|--------|
| (n =128) | RPCI stage I | 100% | 94.60% | 88.40% | 85.40% | 85.40% | 85.40% |
| (n =50) | RPCI stage II | 100% | 79.80% | 66.20% | 56.90% | 53.30% | 53.30% |
| (n =63) | RPCI stage III | 100% | 72.10% | 54% | 47.40% | 41% | 33.40% |
| (n =162) | RPCI stage IV | 100% | 31.70% | 13.40% | 9.30% | 5.20% | 4.80% |
| | SEER stage I | 100% | 76% | 67.50% | 62% | 59.30% | 56.60% |
| | SEER stage II | 100% | 75.60% | 56.90% | 47% | 41.40% | 37.30% |
| | SEER Stage III | 100% | 62.30% | 38.90% | 28.60% | 23.50% | 20.20% |
| | SEER stage IV | 100% | 25.60% | 10.50% | 6.10% | 4.50% | 3.70% |

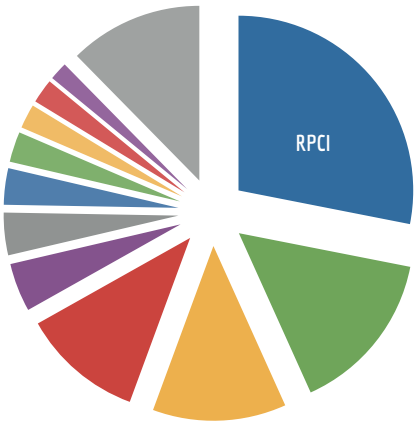
American Joint Commission on Cancer (AJCC) Stage I-IV stomach cancer

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

PANCREAS

CY 2012 Inpatient Market Share by Hospital - PANCREAS

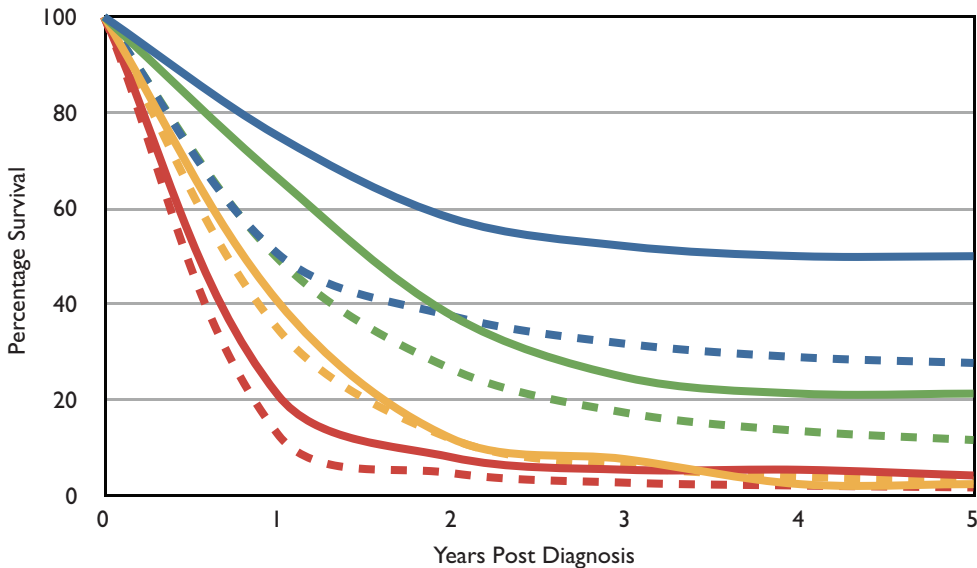
The information in the graph below provides WNY inpatient market share data based on NYS SPARCS data. It shows that Roswell Park Cancer Institute treated 28 percent of all WNY cases requiring hospital stays in 2012.



28%
Inpatient
Market Share

Survival Data

Five-Year Survival, Pancreas Cancer, Stages I, II, III & IV
Cases Diagnosed (2004-2010)



— RPCI stage I — RPCI stage II — RPCI stage III — RPCI stage IV
- - - SEER stage I - - - SEER stage II - - - SEER stage III - - - SEER stage IV

| | | 0 | 1 | 2 | 3 | 4 | 5 |
|----------|----------------|------|--------|--------|--------|--------|--------|
| (n =29) | RPCI stage I | 100% | 75.10% | 57.90% | 52.10% | 50% | 50% |
| (n =162) | RPCI stage II | 100% | 66.30% | 37.60% | 24.70% | 21.30% | 21.30% |
| (n =109) | RPCI stage III | 100% | 40.50% | 11.90% | 7.60% | 2.40% | 2.40% |
| (n =346) | RPCI stage IV | 100% | 21% | 8% | 5.40% | 5.40% | 4.20% |
| | SEER stage I | 100% | 50.50% | 37.50% | 31.70% | 28.90% | 27.70% |
| | SEER stage II | 100% | 49.50% | 26.40% | 17.30% | 13.50% | 11.60% |
| | SEER Stage III | 100% | 34.80% | 11.80% | 6.10% | 4% | 3.20% |
| | SEER stage IV | 100% | 12.80% | 4.70% | 2.70% | 2.10% | 1.70% |

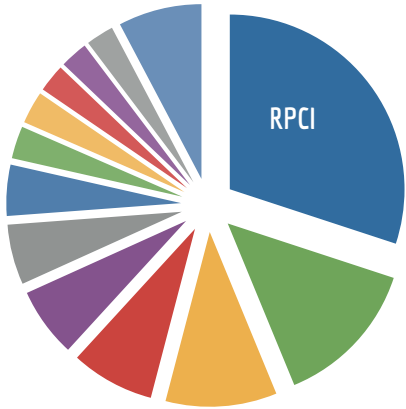
American Joint Commission on Cancer (AJCC) Stage I-IV pancreas cancer

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

LIVER

CY 2012 Inpatient Market Share by Hospital - LIVER

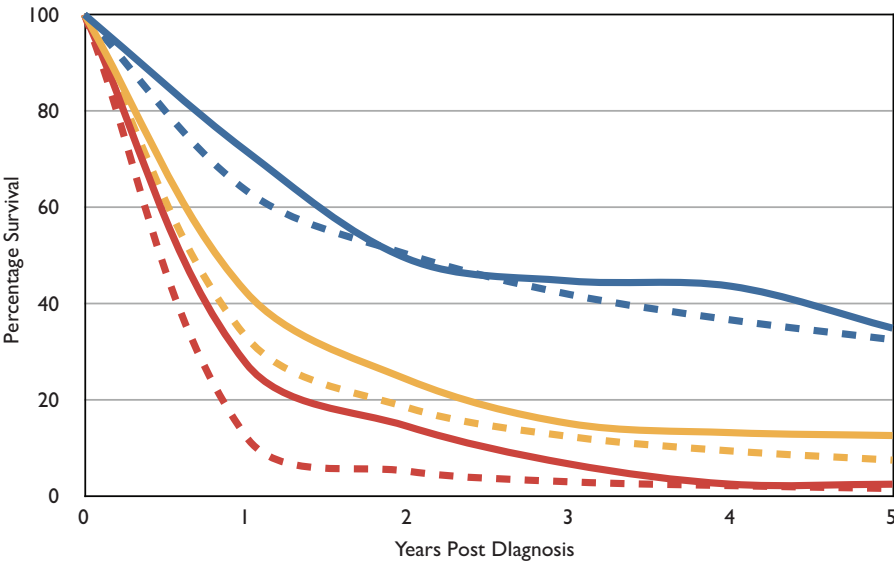
The information in the graph below provides WNY inpatient market share data based on NYS SPARCS data. It shows that Roswell Park Cancer Institute treated 30 percent of all WNY cases requiring hospital stays in 2012.



30%
Inpatient
Market Share

Survival Data

Five-Year Survival, Liver Cancer, Stages I, II, III & IV
Cases Diagnosed (2004-2010)



— RPCI stage I — RPCI stage III — RPCI stage IV
- - - SEER stage I - - - SEER stage III - - - SEER stage IV

| | | 0 | 1 | 2 | 3 | 4 | 5 |
|---------|----------------|------|--------|--------|--------|--------|--------|
| (n =43) | RPCI stage I | 100% | 71.70% | 49.30% | 44.70% | 43.60% | 34.90% |
| (n =73) | RPCI stage III | 100% | 42.40% | 24.20% | 15.10% | 13.20% | 12.60% |
| (n =52) | RPCI stage IV | 100% | 27.60% | 14.50% | 6.70% | 2.50% | 2.50% |
| | SEER stage I | 100% | 63.50% | 50.20% | 41.90% | 36.60% | 32.50% |
| | SEER Stage III | 100% | 33.10% | 18.40% | 12.40% | 9.40% | 7.50% |
| | SEER stage IV | 100% | 12.40% | 5.20% | 3% | 2.20% | 1.60% |

Sample size too small for stage II

American Joint Commission on Cancer (AJCC) Stage I-IV liver cancer

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

Quality Measures

Roswell Park’s GI Program monitors colectomies, pancreatectomies and hepatectomies using the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP®).The data in NSQIP provides a comparison on morbidity, mortality, surgical site infections (SSI) and pneumonia. All these metrics have shown significant improvement from 2012 to 2013, as shown below. Roswell Park has physician-led teams working on each of these metrics to attain the expected odds ratio of one (1).

| Colectomy | | | | | | | | | | | | | |
|------------------------|----------------------|-----------------|------------------------|--|----------------|----------------------|--------------------------------------|----------|----------------|------------------------------------|----------------|----------------------|--|
| Time Period | Procedures reviewed* | Mortality Rates | Mortality Odds Ratio** | Odds ratio Mortality Confidence Interval | Morbidity Rate | Morbidity Odds Ratio | Morbidity Odds Ratio Confidence rate | SSI Rate | SSI Odds Ratio | SSI Odds Ratio Confidence Interval | Pneumonia Rate | Pneumonia Odds Ratio | Pneumonia Odds Ratio Confidence Interval |
| CY 2012 | 91 | 3.30% | 1.34 | 0.60-2.96 | 28.57% | 1.25 | 0.86-1.81 | 16.48% | 1.12 | 0.71-1.76 | 5.49% | 1.51 | 0.74-3.04 |
| CY 2013 | 55 | 0% | 0.99 | 0.76-1.29 | 14.55% | 1.06 | 0.67-1.69 | 9.09% | 1 | 0.56-1.77 | 0% | 0.87 | 0.33-2.34 |
| Goal/Target Odds Ratio | | | <=1.00 | | | <=1.00 | | | <=1.00 | | | <=1.00 | |

| Pancreatectomy | | | | | | | | | | | |
|------------------------|----------------------|----------------|------------------------|--|----------------|----------------------|--|----------|----------------|------------------------------------|--|
| Time Period | Procedures reviewed* | Mortality Rate | Mortality Odds Ratio** | Mortality Odds Ratio Confidence Interval | Morbidity Rate | Morbidity Odds Ratio | Morbidity Odds Ratio Confidence Interval | SSI Rate | SSI Odds Ratio | SSI Odds Ratio Confidence Interval | |
| CY 2012 | 35 | 0% | 0.65 | 0.14-2.94 | 37.14% | 1.19 | 0.70-1.99 | 22.86% | 1.13 | 0.66-1.93 | |
| CY 2013 | 38 | 0% | 0.97 | 0.50-1.86 | 23.68% | 1.00 | 0.59-1.70 | 21.62% | 1.12 | 0.63-1.99 | |
| Goal/Target Odds Ratio | | | <=1.00 | | | <=1.00 | | | <=1.00 | | |

| Hepatectomy | | | | | | | |
|------------------------|----------------------|----------------|------------------------|--|----------|----------------|------------------------------------|
| Time Period | Procedures Reviewed* | Morbidity Rate | Morbidity Odds Ratio** | Morbidity Odds Ratio Confidence Interval | SSI Rate | SSI Odds Ratio | SSI Odds Ratio Confidence Interval |
| CY 2012 | 16 | 31.25% | 1.05 | 0.76-1.46 | 12.50% | 1.02 | 0.62-1.66 |
| CY 2013 | 10 | 0% | 0.79 | 0.38-1.64 | 0% | 0.83 | 0.34-1.99 |
| Goal/Target Odds Ratio | | | <=1.00 | | | <=1.00 | |

* The procedures reviewed are a small sample of total procedures performed

** The odds ratio compares the results of one hospital to other hospitals participating in NSQIP. An odds ratio greater than 1.0 implies that the event is more likely, and if less than 1.0 it would be less likely to occur. The confidence interval (CI) tells us whether the odds ratio is statistically different from the other hospitals in NSQIP. If the confidence interval does not overlap 1.0, the outcome would be considered an outlier. Any confidence interval that includes 1.0 would be designated “as expected” by NSQIP.

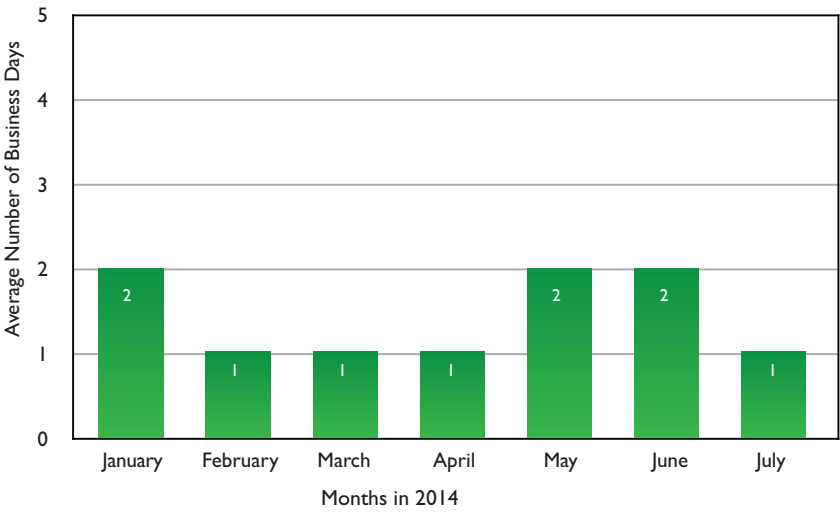
Data Source: American College of Surgeons (National Surgical Quality Improvement Program)

GENITOURINARY

Introduction

Roswell Park Cancer Institute (RPCI) has a comprehensive Genitourinary (GU) Program that includes prostate, bladder, kidney and testicular cancer. RPCI uses a multidisciplinary approach to provide individualized care to GU patients. Annually, RPCI’s GU Program evaluates over 1,200 new patients, which result in 900 procedures (inpatient or outpatient), 1,600 chemotherapy visits, and 11,000 office visits with our care providers.

Surgical Urology Program at
RPCI - Average Time for First Appointment

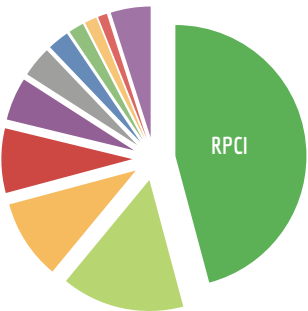


less than a **2** business day wait

PROSTATE

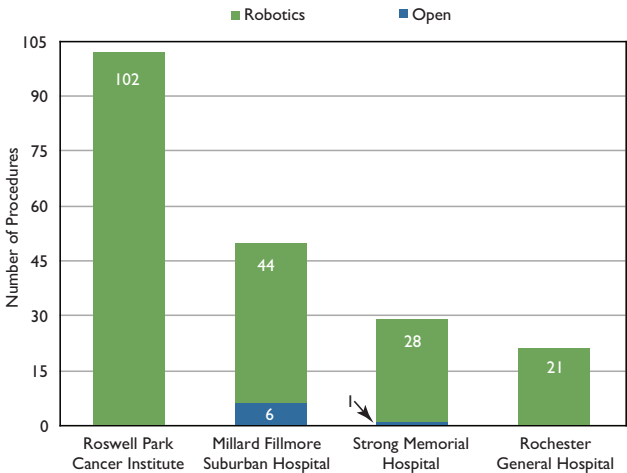
CY 2012 Inpatient Market Share by Hospital - PROSTATE

The information in the graph to the right provides WNY market share data based on NYS inpatient SPARCS data. It shows that Roswell Park Cancer Institute treated 46 percent of all WNY cases requiring hospital stays in 2012.



46%
Inpatient
Market Share

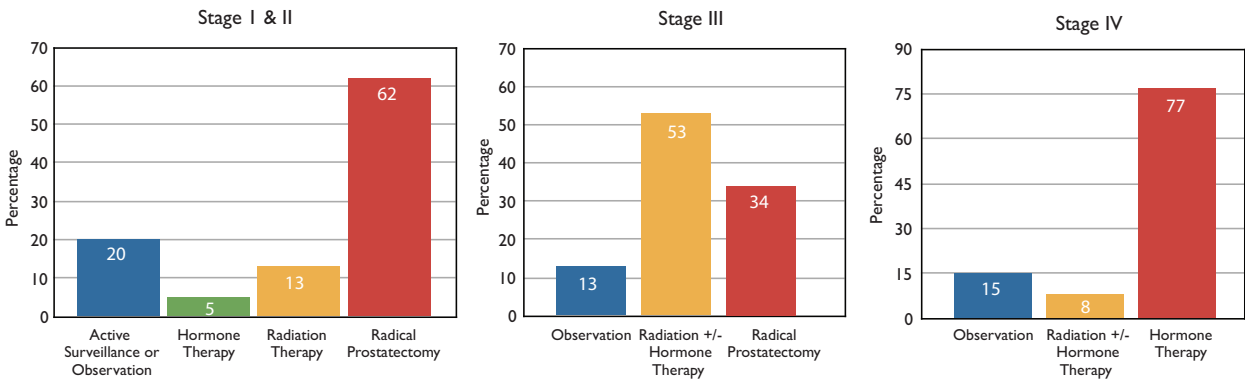
CY 2013 WNY Open & Robot-Assisted Prostatectomies
(Data Includes All Hospitals with 20 or More Cases in CY 2013)



Data Source:
CY 2013 NYS SPARCS Ambulatory Surgical Data taken from HANYS/Truven Market Expert.
Patient Origin Set for Western New York Region (Allegany, Cattaraugus, Chautauqua, Erie, Genesee, Niagara, Orleans & Wyoming Counties).
Data is based on Principal Procedure ICD-9.
Robotic Prostatectomy Procedures = Discharges with ICD-9 code 60.5 (Radical Prostatectomy) as Principal Procedure, as well as ICD-9 codes 54.21 (Laparoscopy) or Robot-Assisted codes 17.41, 17.42, 17.45 or 17.49 as Secondary Procedures.
Open Prostatectomy Procedures = Discharges with ICD-9 codes 60.5 (Radical Prostatectomy) as Principal Procedure when none of the Robot-Assisted secondary procedure codes are present.

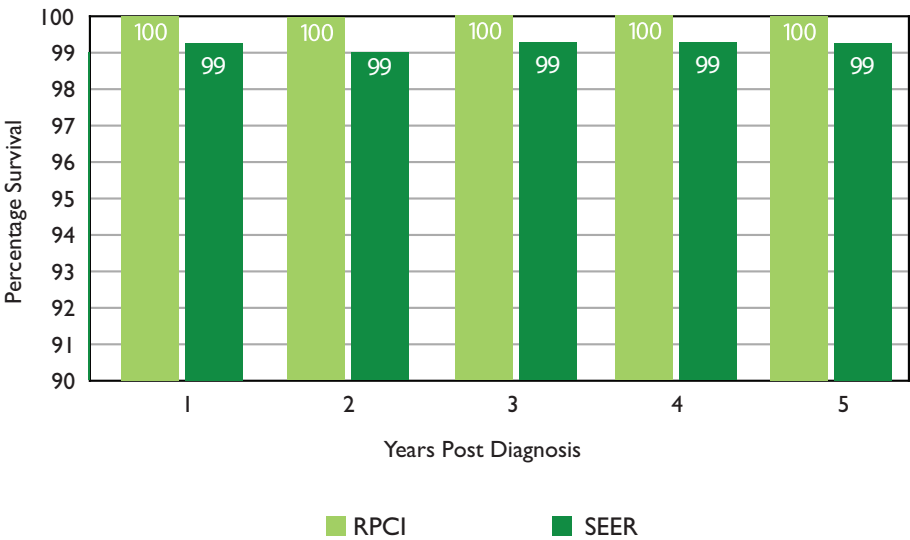
Treatment Received by Localized Prostate Cancer Patients

Prostate Treatment Options for Stages I, II, III & IV



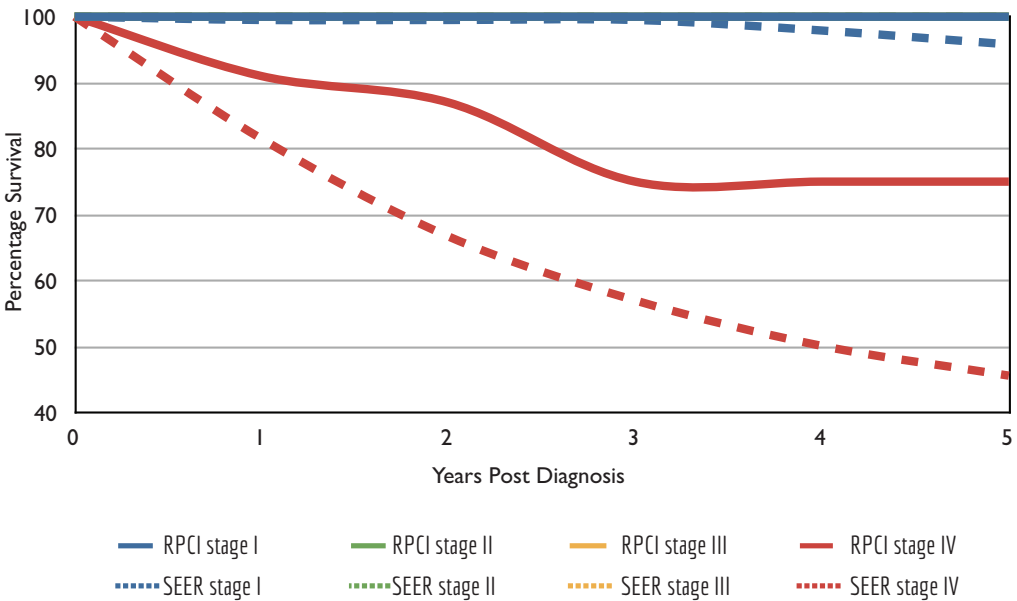
Survival Data

Five-Year Relative Survival, All Patients, Stages I, II, III & IV
Cases Diagnosed (2002-2009)



Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2012 Sub (1973-2010 varying), National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2013, based on the November 2012 submission.

Five-Year Survival, Prostate Cancer, Stages I, II, III & IV
Cases Diagnosed (2004-2010)



| | | 0 | 1 | 2 | 3 | 4 | 5 |
|------------|----------------|------|--------|--------|--------|--------|--------|
| (n =54) | RPCI stage I | 100% | 100% | 100% | 100% | 100% | 100% |
| (n =1,291) | RPCI stage II | 100% | 100% | 100% | 100% | 100% | 100% |
| (n =280) | RPCI stage III | 100% | 100% | 100% | 100% | 100% | 100% |
| (n =163) | RPCI stage IV | 100% | 91% | 87% | 75% | 75% | 75% |
| | SEER stage I | 100% | 99.50% | 99.50% | 99.50% | 97.90% | 95.80% |
| | SEER stage II | 100% | 100% | 100% | 100% | 100% | 100% |
| | SEER Stage III | 100% | 100% | 100% | 100% | 100% | 100% |
| | SEER stage IV | 100% | 81.50% | 66.70% | 57.00% | 50.10% | 45.60% |

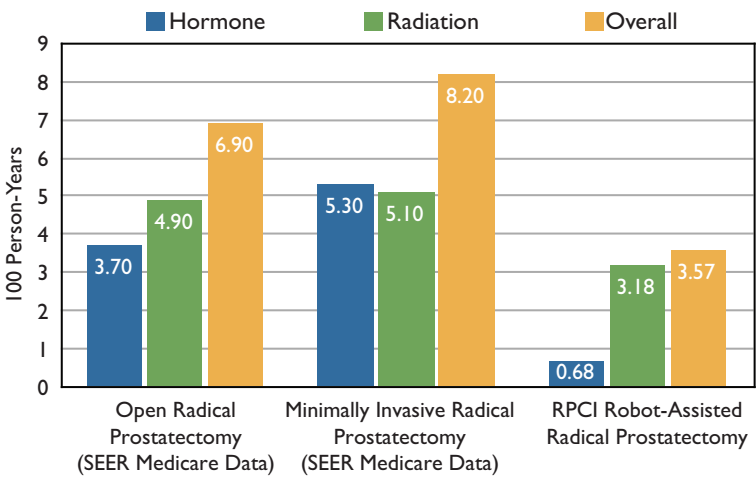
American Joint Commission on Cancer (AJCC) Stage I-IV prostate cancer

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

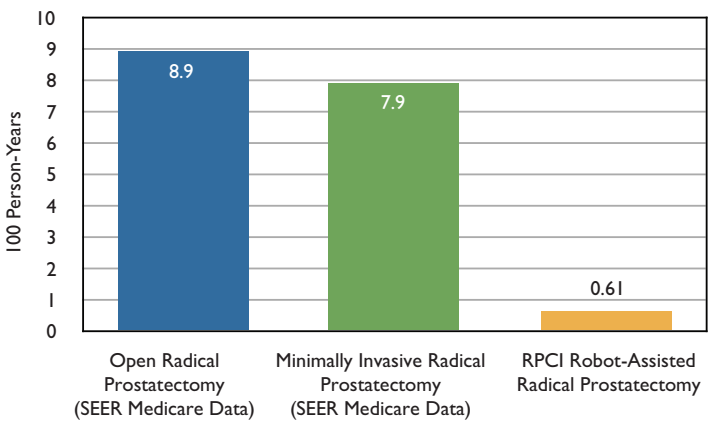
Outcomes Data

Since the Center for Robotic Surgery at RPCI opened in 2004, almost 100% of operations have been done with robot assistance.

Incidence of RPCI Patients Who Required Additional Treatments After Surgery,
Compared to National Averages Based on SEER-Medicare Calculations



Incidence of RPCI Patients Who, After Robot-Assisted Radical Prostatectomy,
Experienced Urinary Incontinence Requiring Procedural Intervention



Reference:
Hu JC, GU X, Lipsitz SR et al. Comparative effectiveness of minimally invasive vs. open radical prostatectomy. JAMA 2009; 302 (14): 1557-1564

Prostate Cancer Active Surveillance (AS) Patients at Roswell Park Cancer Institute

Treatment for localized prostate cancer is often associated with sexual, urinary or bowel morbidity. Active surveillance provides an alternative management option for low-risk prostate cancer patients, which allows patients to delay or avoid altogether the morbidity of treatment. Active surveillance involves repeated PSA-level monitoring and prostate examinations, often every six months, and repeat prostate biopsies when indicated. The goal is to detect disease progression at its earliest point in order to initiate treatment without missing the window for cure. Increasing evidence supports the safety of this approach, and the National Comprehensive Cancer Network now recommends active surveillance as the first option for many men with low- or very-low-risk prostate cancer. Roswell Park Cancer Institute is a leader in the field of prostate cancer active surveillance, with among the largest number of patients being managed with active surveillance in the region and nationally.

| Institution | # AS patients |
|--|---------------|
| Johns Hopkins University | 870 |
| University of California - San Francisco | 465 |
| Roswell Park Cancer Institute | 371 |
| Memorial Sloan Kettering Cancer Center | 342 |
| Cleveland Clinic | 133 |

References:

Patel HD, Feng Z, Landis P, Trock BJ, Epstein JI, Carter HB. Prostate specific antigen velocity risk count predicts biopsy reclassification for men with very low risk prostate cancer. *J Urol.* 2014 Mar;191(3):629-37.

Cary KC, Cowan JE, Sanford M, Shinohara K, Perez N, Chan JM, Meng MV, Carroll PR. Predictors of Pathologic Progression on Biopsy Among Men on Active Surveillance for Localized Prostate Cancer: The Value of the Pattern of Surveillance Biopsies. *Eur Urol.* 2013 Sep 9. pii: S0302-2838(13)00987-1.

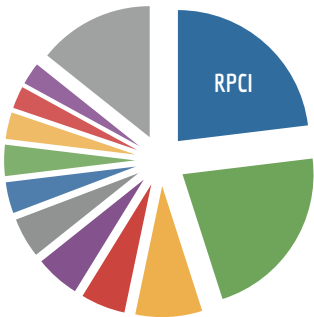
Braun K, Ahallal Y, Sjoberg DD, Ghoneim T, Dominguez Esteban M, Mulhall J, Vickers A, Eastham J, Scardino PT, Touijer KA. Effect of repeated prostate biopsies on erectile function in men on active surveillance for prostate cancer. *J Urol.* 2014 Mar;191(3):744-9.

Odom BD, Mir MC, Hughes S, Senechal C, Santy A, Eyraud R, Stephenson AJ, Ylitalo K, Miocinovic R. Active surveillance for low-risk prostate cancer in African American men: a multi-institutional experience. *Urology.* 2014 Feb;83(2):364-8.

BLADDER

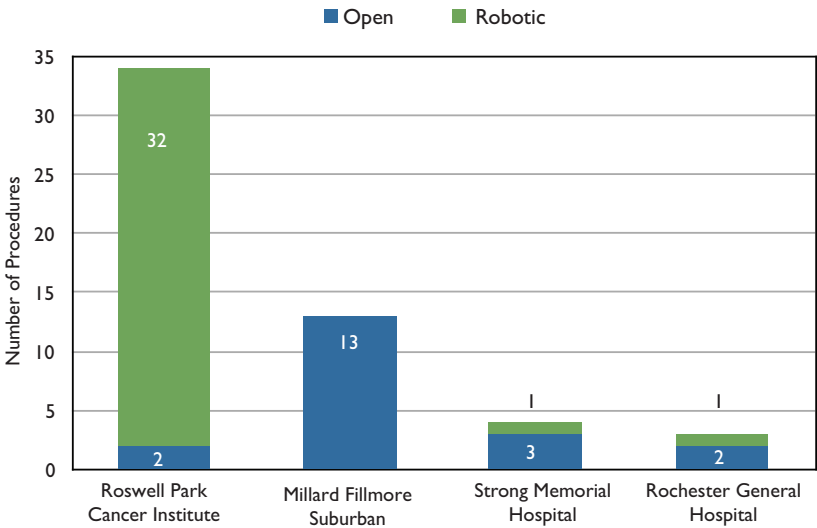
CY 2012 Inpatient Market Share by Hospital - BLADDER

The information in the graph to the right provides WNY inpatient market share data based on NYS SPARCS data. It shows that Roswell Park Cancer Institute treated 23 percent of all WNY cases requiring hospital stays in 2012.



23%
Inpatient
Market Share

CY 2013 WNY Open & Robot-Assisted Cystectomies
(Data Includes All Hospitals with 20 or More Cases in CY 2013)

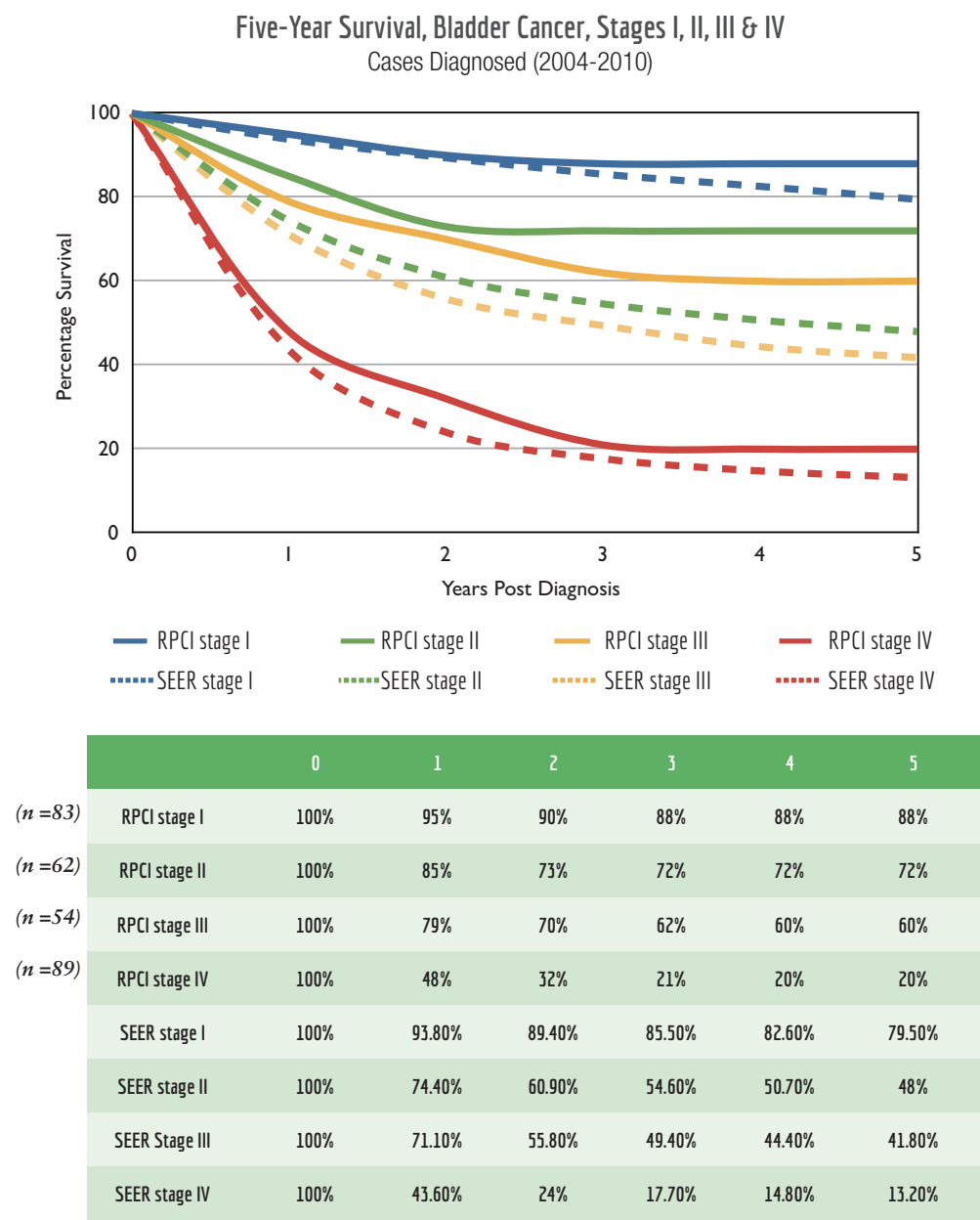


Data Source:
CY 2013 NYS SPARCS Ambulatory Surgical Data taken from HANYS/Truven Market Expert.
Patient Origin Set for Western New York Region (Allegany, Cattaraugus, Chautauqua, Erie, Genesee, Niagara, Orleans & Wyoming Counties).
Data is based on Principal Procedure ICD-9.

Robotic Cystectomy Procedures = Discharges with ICD-9 codes 57.71 (Radical Cystectomy), 57.6 (Partial Cystectomy) or 57.79 (Complete Cystectomy) as Principal Procedure, as well as ICD-9 codes 54.21 (Laparoscopy) or Robot-Assisted Codes 17.41, 17.42, 17.45 or 17.49 as Secondary Procedures.

Open Cystectomy Procedures = Discharges with ICD-9 codes 57.71 (Radical Cystectomy), 57.6 (Partial Cystectomy) or 57.79 (Complete Cystectomy) as Principal Procedure when none of the Robot-Assisted secondary procedure codes are present.

Survival Data



American Joint Commission on Cancer (AJCC) Stage I-IV urinary bladder cancer

Data Source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

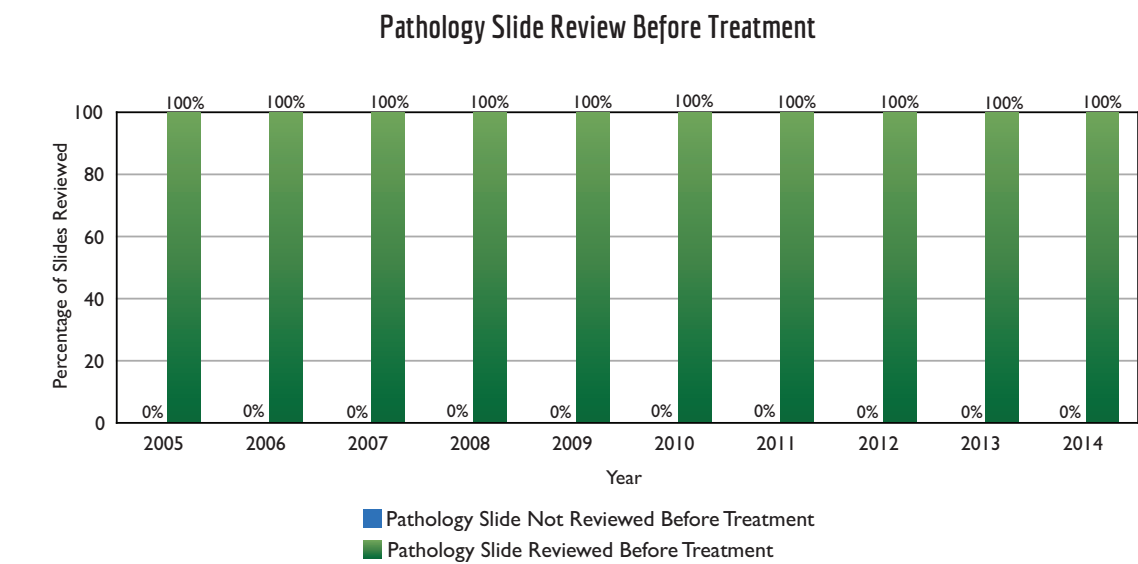
How Roswell Park Cancer Institute Measures
Quality of Care for Robot-Assisted Radical Cystectomy

OUR PROGRAM

- Pioneers in the robot-assisted approach to bladder cancer
- A decade of robot-assisted surgery for redo bladder surgery
- Pioneers in intracorporeal urinary diversion
- Houses the International Radical Cystectomy Consortium (IRCC) program, which partners with 69 surgeons at 37 institutions in 14 different countries

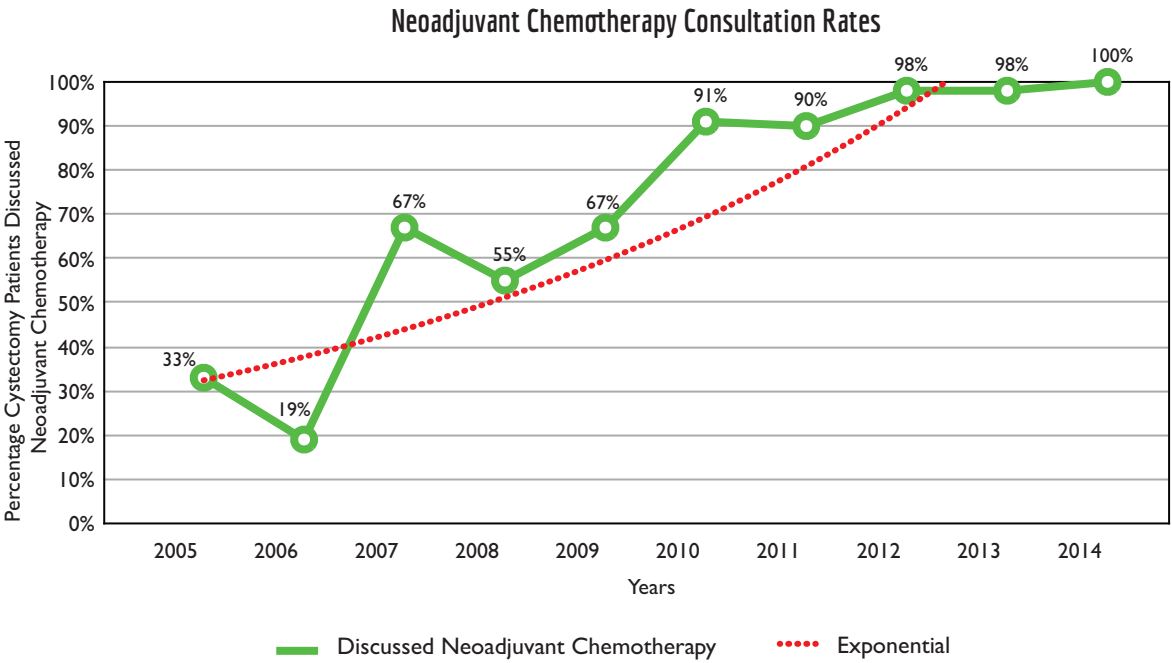
PREOPERATIVE MEASURES

- Pathological re-review of established bladder cancer specimens can identify histological variants and might lead to better risk stratification and patient counseling, which will impact treatment.
- o 18% of specimens exhibited significant discrepancies from referring diagnosis
(Coblentz JRCancer 2001, 1(91) 7(1284-90))
 - o 51% of specimens produced change in clinical grade or pathological stage; up to 40% were upstaged
(Turker P. 13 Jul 2012, Sept 110 (6) 804-11)



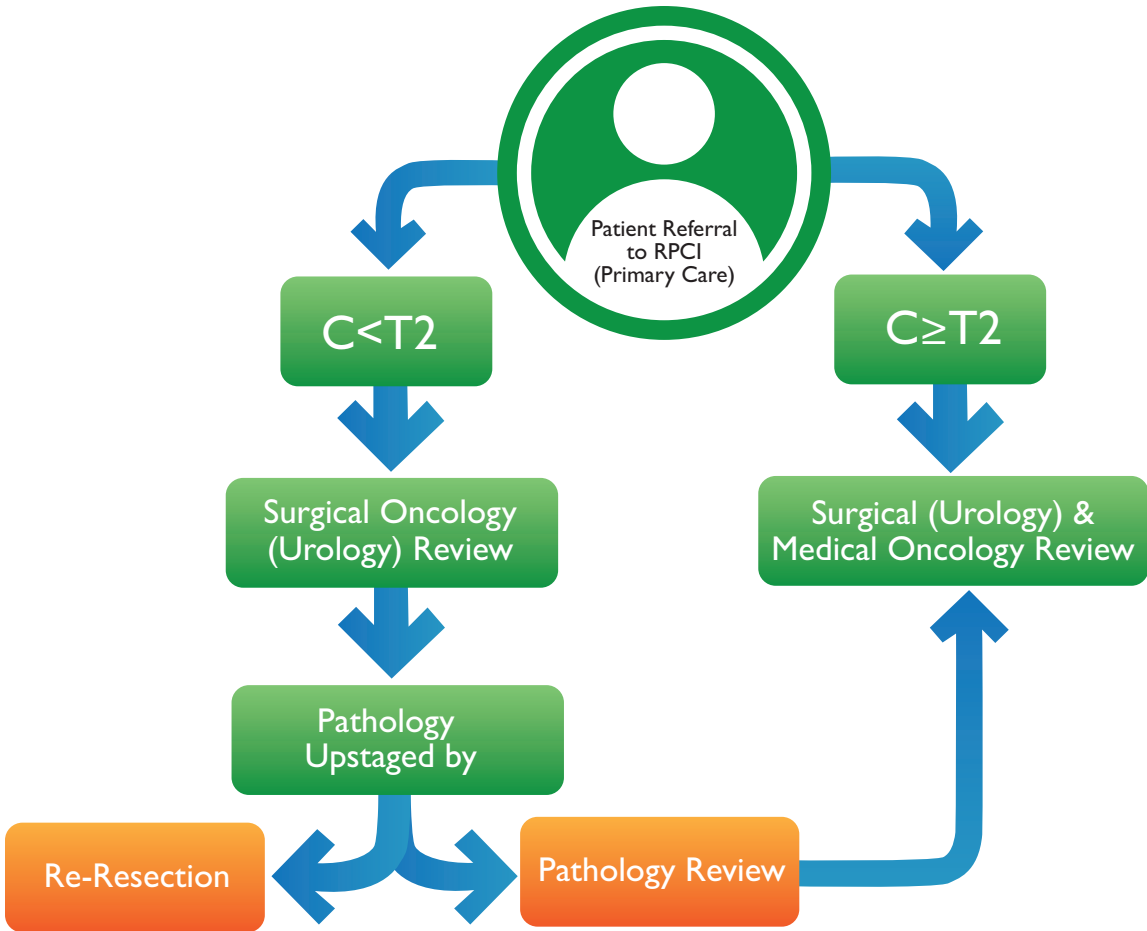
Neoadjuvant Chemotherapy Consultation

- Traditionally radical cystectomy has been the main option for invasive bladder cancer.
- Significant benefits have been observed after neoadjuvant chemotherapy but the rate of consultation and administration of neoadjuvant chemotherapy has been low (<15%).



Our multidisciplinary approach has allowed us to raise our neoadjuvant chemotherapy consultation rates from 33% to over 90%.

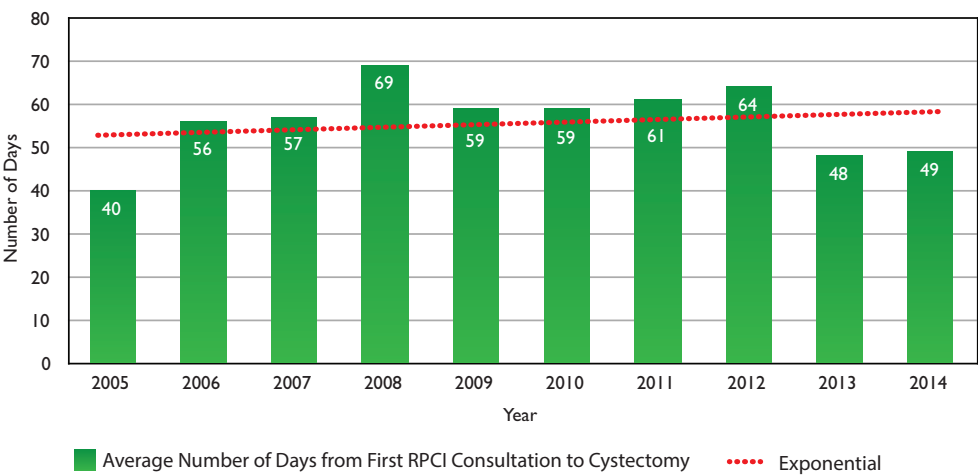
Multidisciplinary Management Algorithm at Roswell Park Cancer Institute



Reference:
Shabnam, R., Crane, A., Din, R., Syed, J.R., Shi, Y., Wilding, G., Levine, E.G., George, S., Pili, R., Trump, D.L., Guru, K.A. (2013) Understanding Avoidance, Refusal, and Abandonment of Chemotherapy Before and After Cystectomy for Bladder Cancer. The Journal of Urology 82(6), 1370-1375.

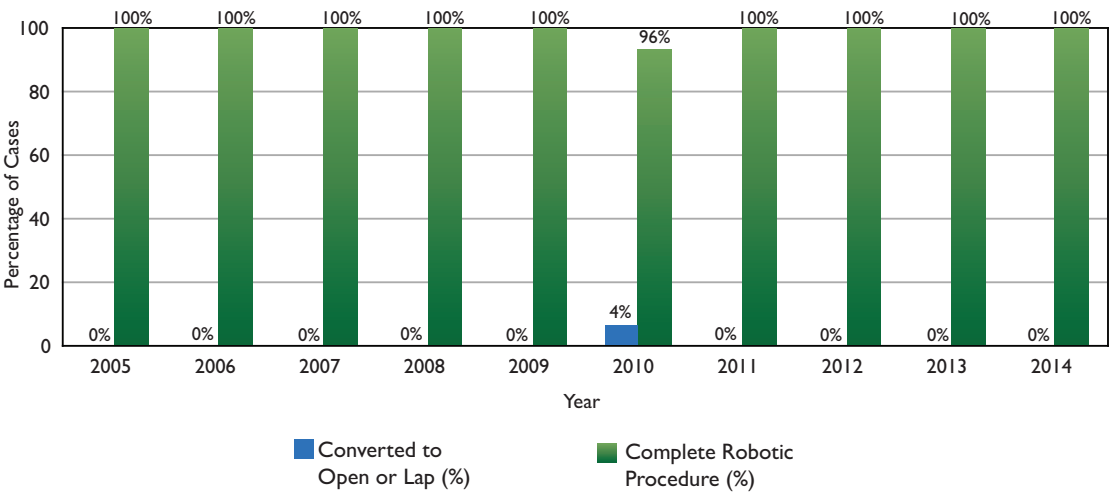
Number of Days from First RPCI Consultation to Cystectomy

- Providing consultation within three months is a quality measure set by the Institute of Medicine.
- Delays in definitive treatment are associated with pathological up-staging and can impact cancer-specific outcomes. *(Kulkarni GS: J Urol 2009; 182; 1318)*
- Of 22,251 patients in National Cancer Data Base, 14.2% experienced treatment delay of three months or greater.
- Patients with muscle-invasive bladder cancer (MIBC) who transferred between diagnostic and treatment hospital were twice as likely to experience treatment delays of greater than three months. *(Care transitions. Tomaszewski J. J Urol 2014, 192, 1349-1354)*

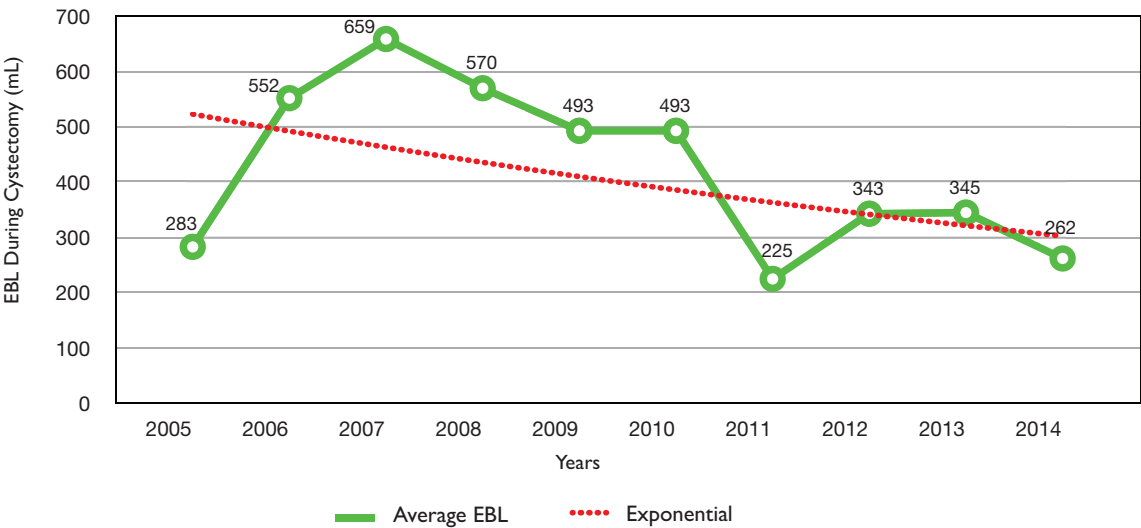


INTRAOPERATIVE MEASURES

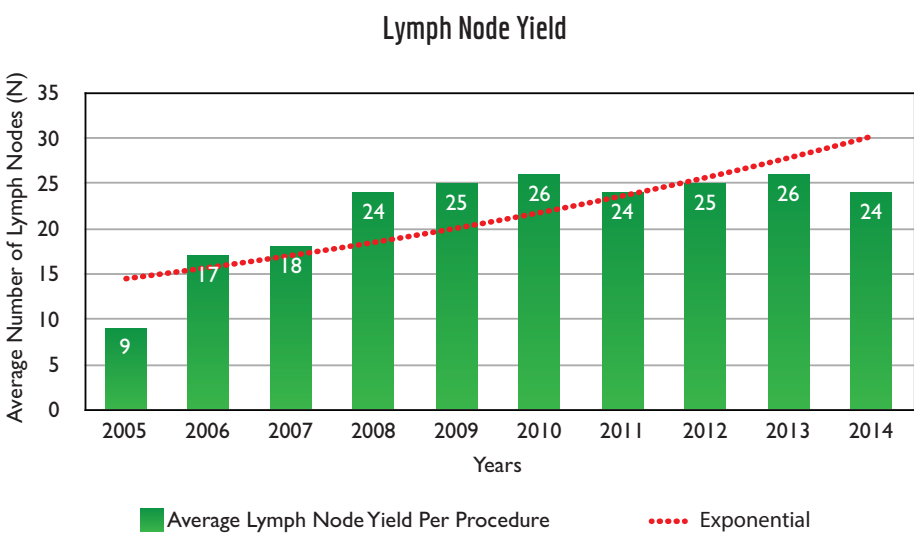
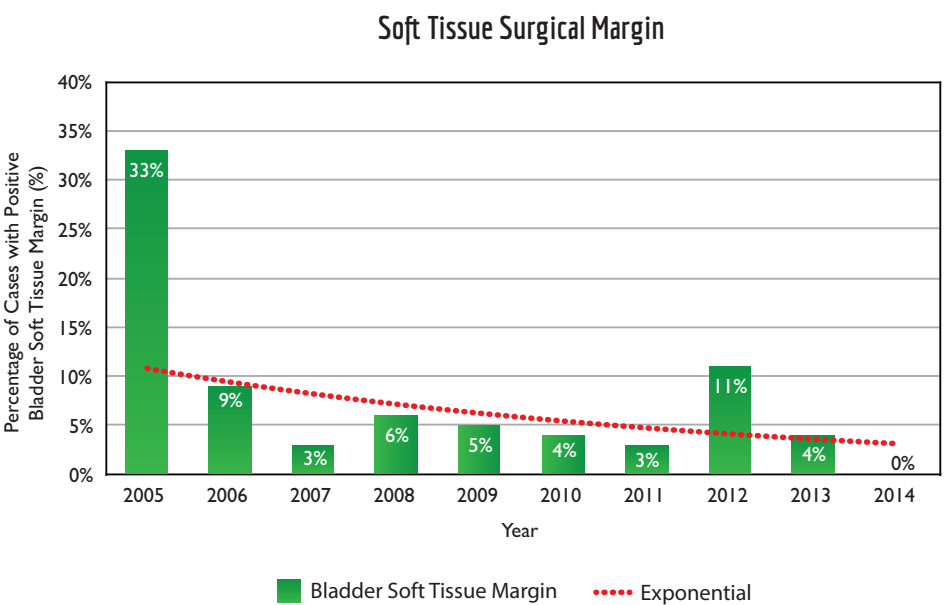
Conversion From Robot-Assisted to Open or Laparoscopic



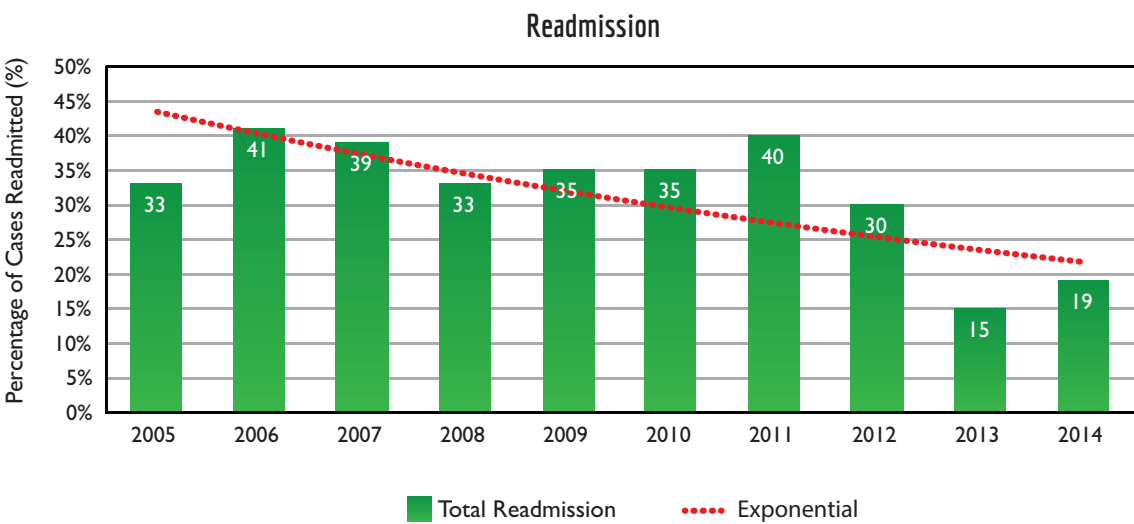
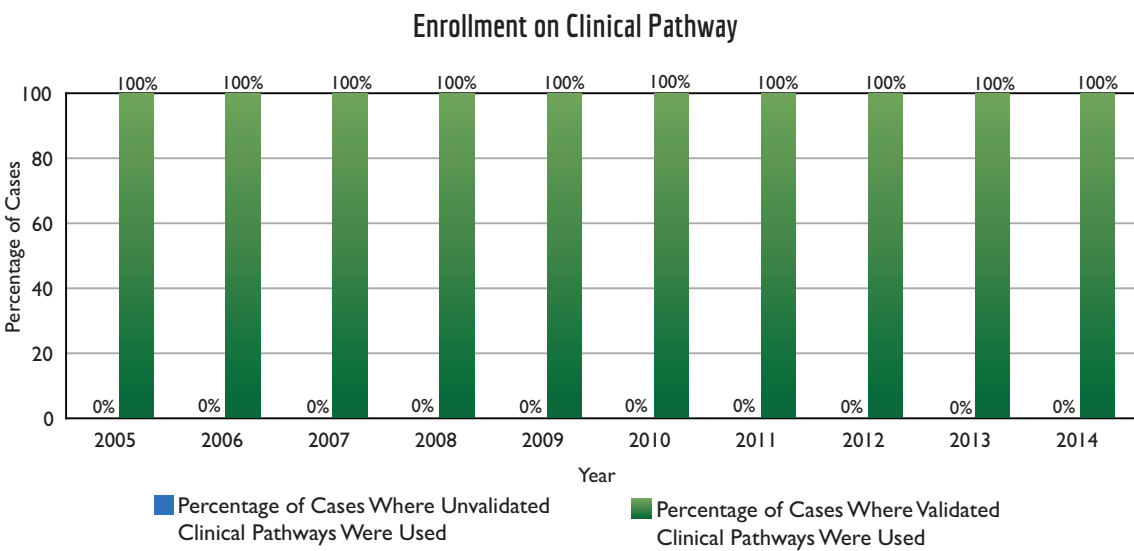
Estimated Blood Loss



OPERATIVE MEASURES

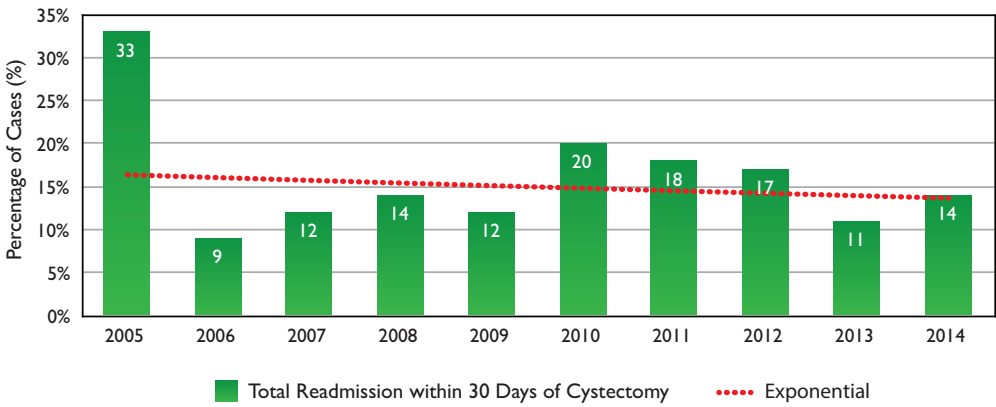


POSTOPERATIVE MEASURES

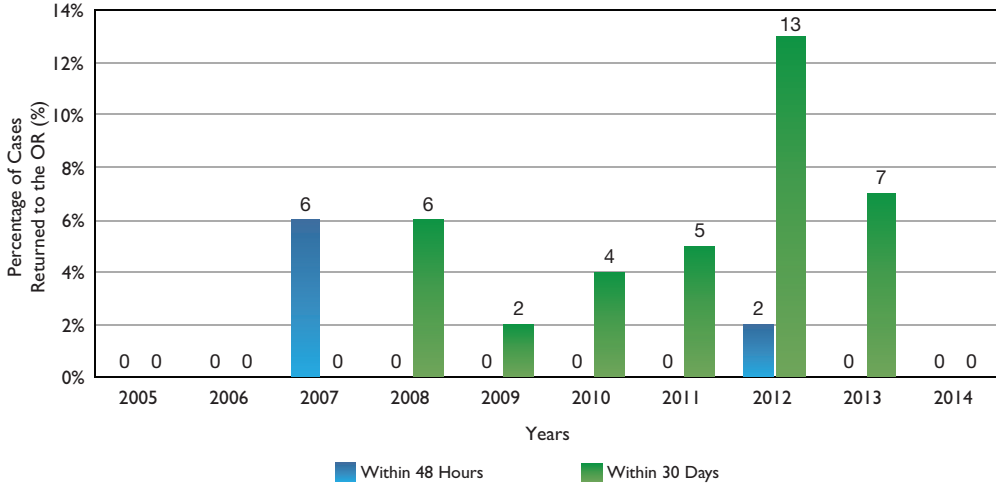


- Readmission after surgery is a key quality indicator and reflects on true magnitude of a complex surgery in an older, sicker patient population.
- Based on 753 open radical cystectomies, 27% were readmitted within 90 days and 20% within 30 days.
Stimson CJ, Chang SS, Barocas DA, Humphrey JE, Patel SG, Clark PE, Smith JA Jr, Cookson MS. Early and late perioperative outcomes following radical cystectomy: 90-day readmissions, morbidity and mortality in a contemporary series. J Urol. 2010 Oct; 184(4):1296-300.
- Our goal is to reduce readmission rates to less than 20%.

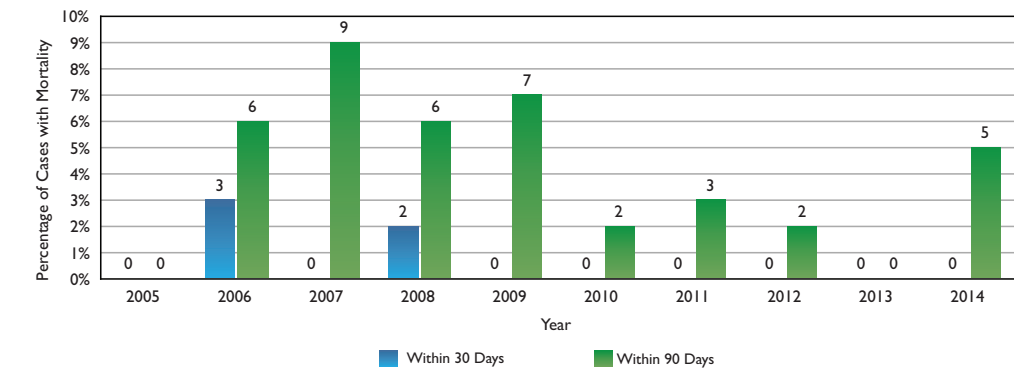
Readmission within 30 Days



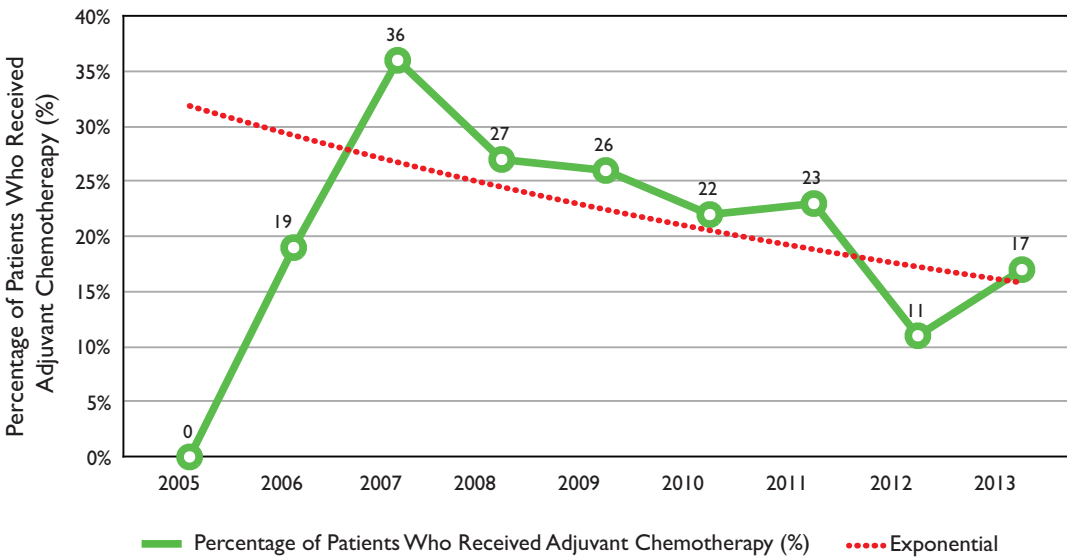
Reoperation



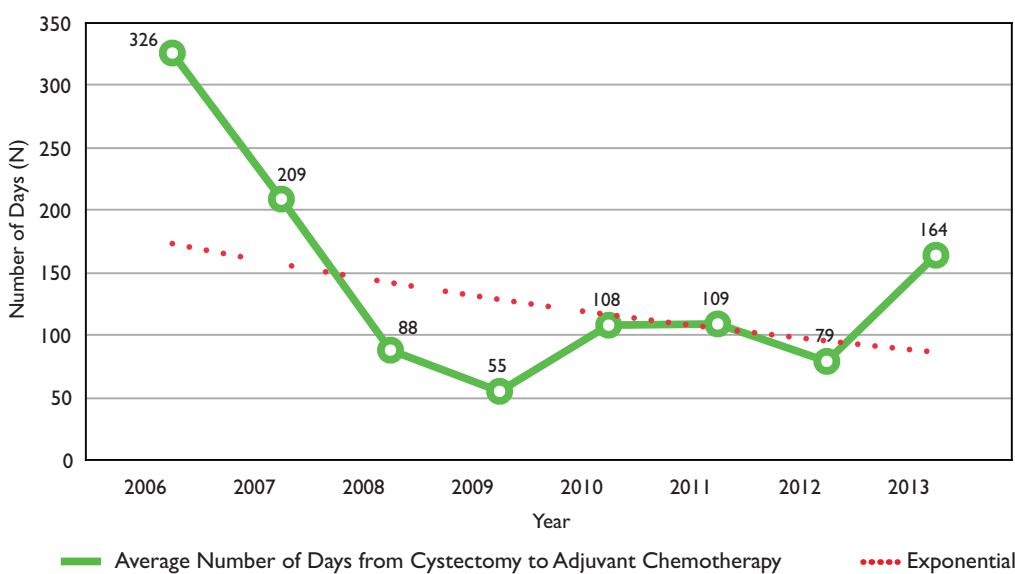
Mortality



Percentage of Patients Who Received Adjuvant Chemotherapy (%)



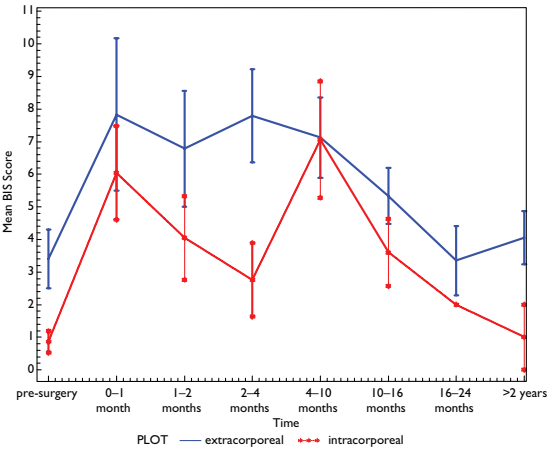
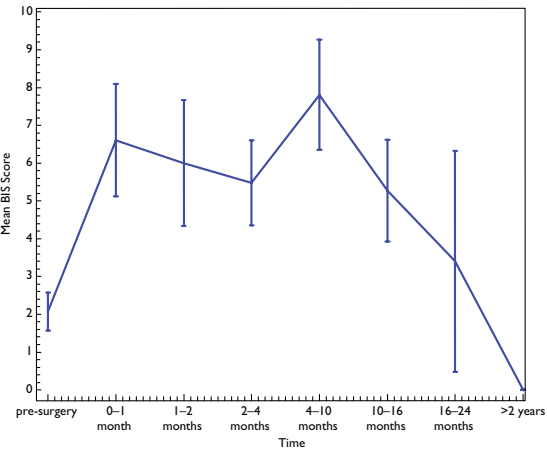
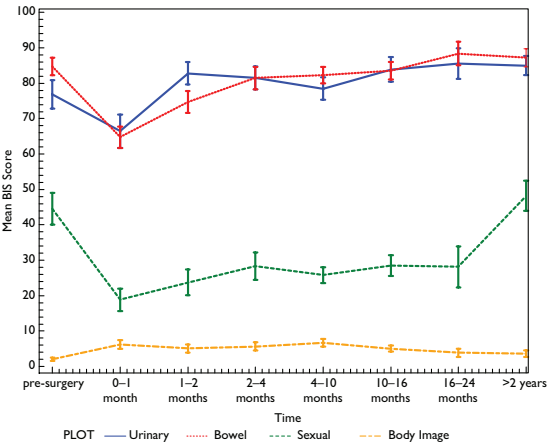
Days from Surgery to Adjuvant Chemotherapy (N)



Quality of Life

BCI* Urinary, Bowel, and Sexual Domain Scores and BIS^o Scores of 113 Patients Who Underwent RARC[‡].

- Quality of life questionnaires are completed by patients before and after surgery at defined intervals.
- Comparing postoperative outcomes to pre-surgery surveys has helped us to objectively define recovery in areas such as urinary, bowel, and sexual function.



BIS scores For Type of Diversion (Intra- vs. Extracorporeal).

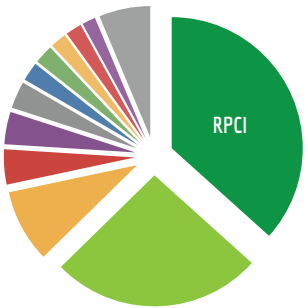
Based on BCI and BIS scores, HRQL outcomes after RARC show recovery of urinary and bowel domains ≤6 months

References:
Poch, M.A., Stegemann, A.P., Shabnam, R., Sharif, M.A., Hussain, A., Consiglio, J.D., Wilding, G.E., Guru, K.A. (2013) Short-term patient reported health-related quality of life (HRQL) outcomes after robot-assisted radical cystectomy (RARC). *The British Journal of Urology International* (113) 260-265.
*BCI: Bladder Cancer Index
^oBIS: Body Image Scale
[‡]RARC: Robot-assisted radical cystectomy

KIDNEY

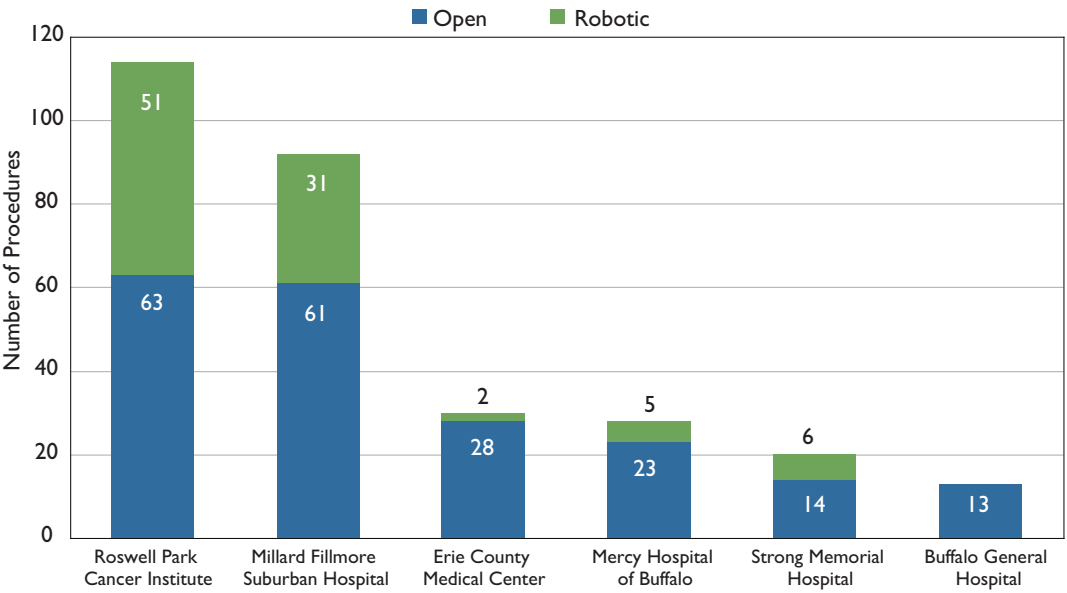
CY 2012 Inpatient Market Share by Hospital - KIDNEY

The information in the graph to the right provides WNY inpatient market share data based on NYS SPARCS data. It shows that Roswell Park Cancer Institute treated 37 percent of all WNY cases requiring hospital stays in 2012.



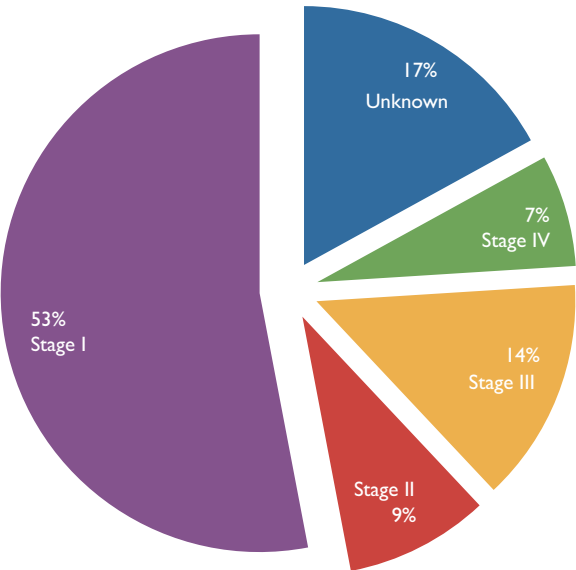
37%
Inpatient
Market Share

CY 2013 WNY Open & Robot-Assisted Nephrectomies
Data Includes All Hospitals With 10 or More Cases in CY 2013



Data Source:
CY 2013 NYS SPARCS Ambulatory Surgical Data taken from HANYS/Truven Market Expert.
Patient Origin Set for Western New York Region (Allegany, Cattaraugus, Chautauqua, Erie, Genesee, Niagara, Orleans & Wyoming Counties).
Data is based on Principal Procedure ICD-9.
Robotic Nephrectomy Procedures = Discharges with ICD-9 codes 55.4 (Partial Nephrectomy) or 55.51-55.54 (Complete Nephrectomy) as Principal Procedure, as well as ICD-9 codes 54.21 (Laparoscopy) or Robot-Assisted Codes 17.41, 17.42, 17.45 or 17.49 as Secondary Procedures.
Open Nephrectomy Procedures = Discharges with ICD-9 codes 55.4 (Partial Nephrectomy) or 55.51-55.54 (Complete Nephrectomy) as Principal Procedure when none of the Robot-Assisted secondary procedure codes are present.

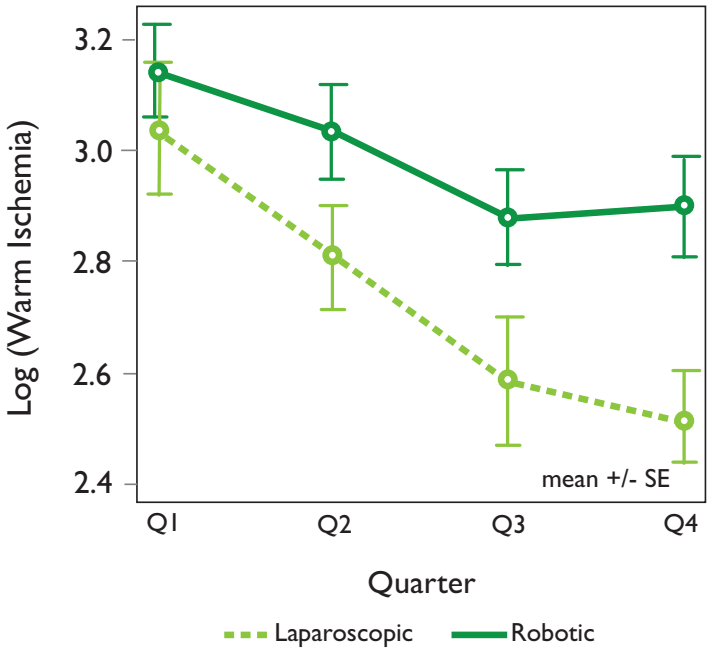
Pathology Stage



Comparison of Laparoscopic Partial Nephrectomy (LPN) and Robotic Partial Nephrectomy (RPN) at Roswell Park Cancer Institute

| | LPN | RPN |
|---|-----|-----|
| Mean Age | 59 | 59 |
| Mean Tumor Size (cm) | 2.7 | 3.2 |
| Mean Operative Time (minutes) | 203 | 170 |
| Mean Estimated Blood Loss (ml) | 245 | 239 |
| Mean Length of Stay (days) | 1.6 | 3.5 |
| Mean Clamped Warm Ischemia Time (minutes) | 20 | 12 |
| Number of Conversions | 2 | 1 |

Operative Time and Warm Ischemia Time Are Superior and Tumor Size Is Greater for RPN When Compared to LPN at RPCI

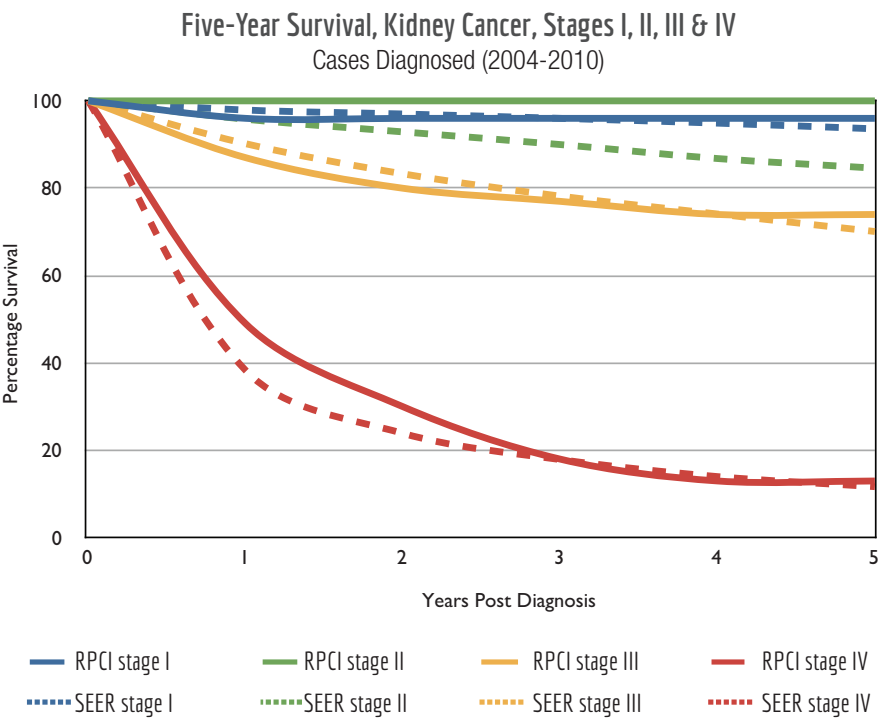


| Comparison | Unadjusted P-value | Adjusted P-value |
|--------------------------------|--------------------|------------------|
| Laparoscopic Q1 vs. Robotic Q1 | 0.497 | 0.497 |
| Laparoscopic Q2 vs. Robotic Q2 | 0.075 | 0.100 |
| Laparoscopic Q3 vs. Robotic Q3 | 0.045 | 0.090 |
| Laparoscopic Q4 vs. Robotic Q4 | 0.003 | 0.012 |

For the novice surgeon, robot-assisted partial nephrectomy provides a faster improvement in warm ischemia time than laparoscopic partial nephrectomy.

Reference:
Hanzly M, Fredrick A, Creighton T, Attwood K, Mehedint D, Kauffman E, Kim HL, Schwaab T. Learning Curves for Robot-Assisted and Laparoscopic Partial Nephrectomy. Journal of Endourology. 2014 August 11.

Survival Data



| | | 0 | 1 | 2 | 3 | 4 | 5 |
|----------|----------------|------|--------|--------|--------|--------|--------|
| (n =331) | RPCI stage I | 100% | 96% | 96% | 96% | 96% | 96% |
| | SEER stage I | 100% | 97.90% | 97% | 96% | 94.90% | 93.60% |
| (n =42) | RPCI stage II | 100% | 100% | 100% | 100% | 100% | 100% |
| | SEER stage II | 100% | 95.80% | 92.90% | 90% | 86.80% | 84.60% |
| (n =97) | RPCI stage III | 100% | 87% | 80% | 77% | 74% | 74% |
| | SEER stage III | 100% | 90.20% | 83.30% | 78.20% | 74.10% | 70.10% |
| (n =147) | RPCI stage IV | 100% | 49% | 30% | 18% | 13% | 13% |
| | SEER stage IV | 100% | 38.30% | 23.90% | 17.90% | 14.00% | 11.70% |

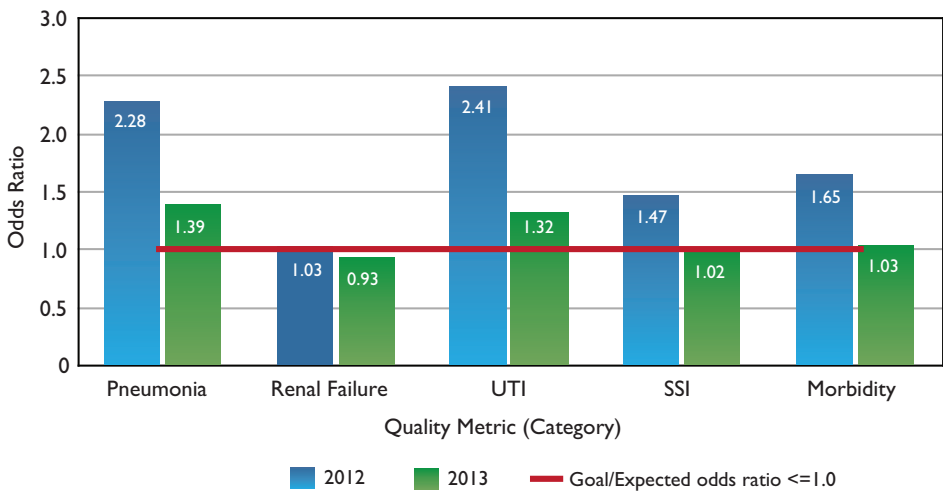
American Joint Commission on Cancer (AJCC) Stage I-IV Kidney Cancer

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

Quality Measures

GU Service

Roswell Park Cancer Institute monitors procedure-specific outcomes using American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP®) measures. In 2012, five categories, reported from NSQIP abstraction data, were classified as areas needing improvement. The service has seen successful in their efforts through a decline in postoperative pneumonia, renal failure, urinary tract infections, and surgical site infections. All of the Urology Service categories in the NSQIP measurement scores have improved since 2012.



| Genitourinary Procedures | | | | | | | | | | | | | | | | |
|--------------------------|---------------------|----------------|-----------------------|-------------------------------|--------------------|--------------------------|-----------------------------------|----------|----------------|-------------------------|----------|----------------|-------------------------|----------------|----------------------|-------------------------------|
| Time Period | Procedures Reviewed | Pneumonia Rate | Pneumonia Odds Ratio* | Pneumonia Confidence Interval | Renal Failure Rate | Renal Failure Odds Ratio | Renal Failure Confidence Interval | UTI Rate | UTI Odds Ratio | UTI Confidence Interval | SSI Rate | SSI Odds Ratio | SSI Confidence Interval | Morbidity Rate | Morbidity Odds Ratio | Morbidity Confidence Interval |
| CY 2012 | 314 | 2.88% | 2.88 | 1.04-4.97 | 0.96% | 1.03 | 0.49-2.17 | 4.78% | 2.41 | 1.40-4.14 | 2.87% | 1.47 | 0.78-2.74 | 12.10% | 1.65 | 1.17-2.34 |
| CY 2013 | 277 | 3.26% | 1.39 | 0.62-3.13 | 0.72% | 0.93 | 0.51-1.72 | 2.89% | 1.32 | 0.69-2.53 | 2.89% | 1.02 | 0.59-1.77 | 8.66% | 1.03 | 0.69-1.54 |
| Goal/target odds ratio) | | | <=1.00 | | | <=1.00 | | | <=1.00 | | | <=1.00 | | | <=1.00 | |

*The odds ratio compares the results of one hospital to other hospitals participating in NSQIP. An odds ratio greater than 1.0 implies that the event is more likely, and if less than 1.0, it would be less likely to occur. The confidence interval (CI) tells us whether the odds ratio is statistically different from the other hospitals in NSQIP. If the confidence interval does not overlap 1.0, the outcome would be considered an outlier. Any confidence interval that includes 1.0 would be designated "as expected" by NSQIP.

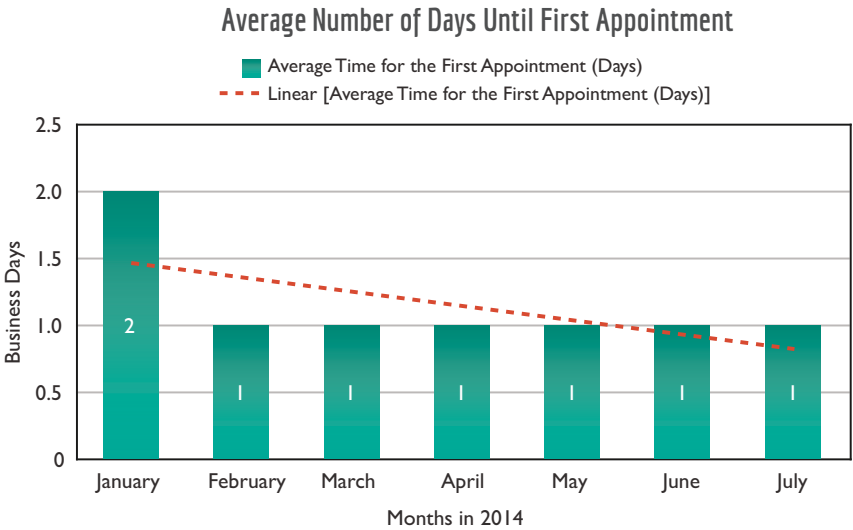
Data source:
American College of Surgeons (National Surgical Quality Improvement Program)

CERVICAL

Gynecologic Oncology Program

Introduction

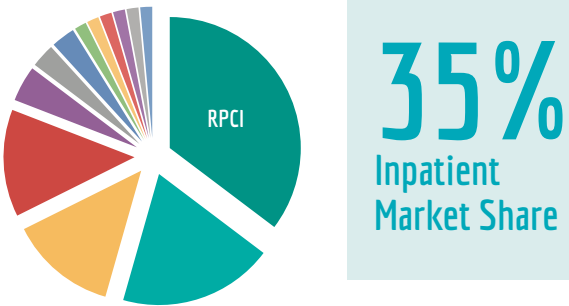
The Gynecologic (GYN) Oncology Program at RPCI has a multidisciplinary team to take care of women with gynecologic cancers, including ovarian, uterine, cervical, vaginal, vulvar, endometrial, and fallopian tube. Annually, Roswell Park's GYN Program evaluates approximately 1,000 new patients, resulting in over 650 procedures (including inpatient and outpatient), 10,000 office visits, and 2,500 chemotherapy visits with our care providers at RPCI.



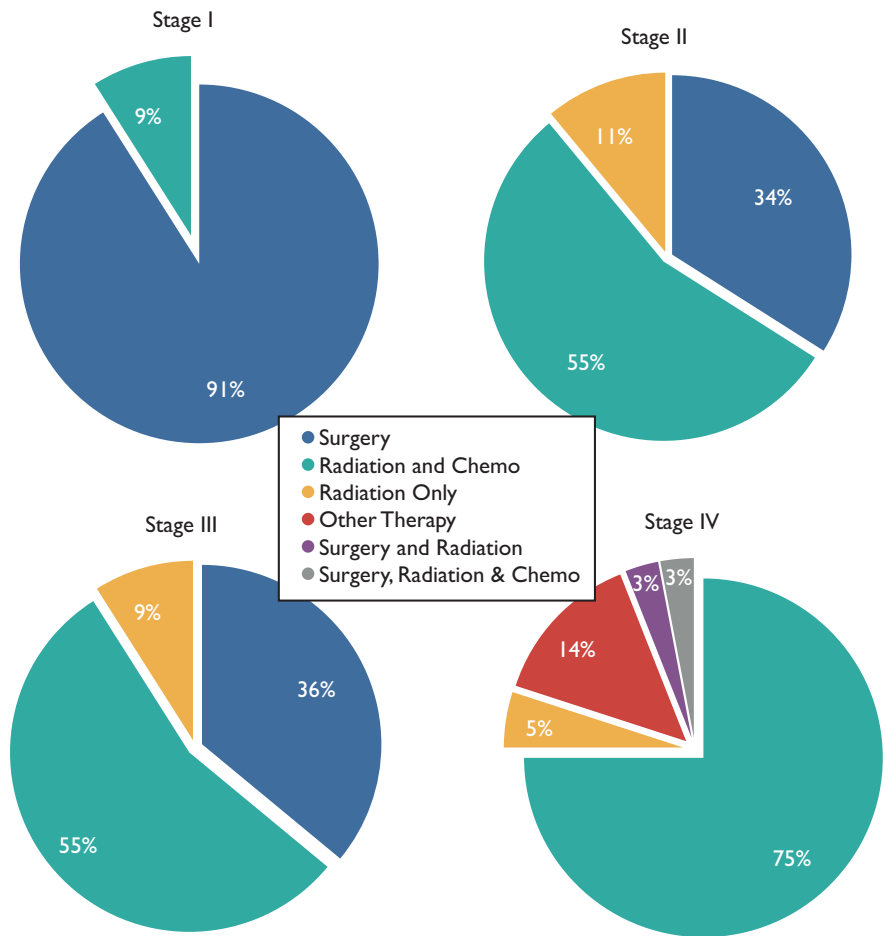
Source: Patient Access

CY 2012 Inpatient Market Share by Hospital - CERVICAL

The information in the graph to the right provides WNY inpatient market share data based on NYS SPARCS data. It shows that Roswell Park Cancer Institute treated 35 percent of all WNY cases requiring hospital stays in 2012.

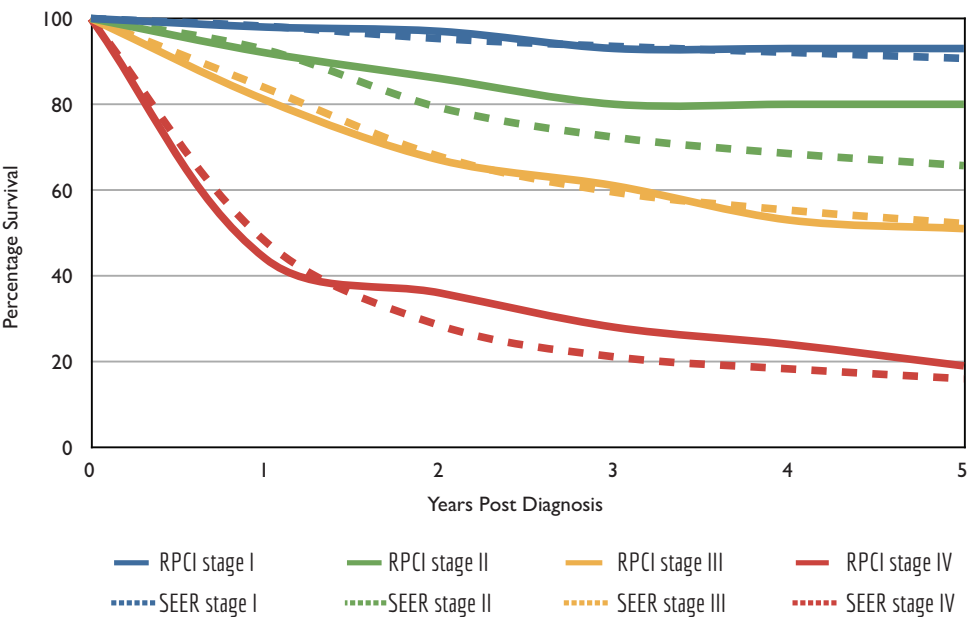


Treatment Received by Patients Diagnosed With Cervical Cancer



Survival Data

Five-Year Survival, Cervical Cancer, Stages I, II, III & IV
Cases Diagnosed (2004-2010)



| | | 0 | 1 | 2 | 3 | 4 | 5 |
|---------|----------------|------|--------|--------|--------|--------|--------|
| (n =92) | RPCI stage I | 100% | 98% | 97% | 93% | 93% | 93% |
| (n =31) | RPCI stage II | 100% | 92% | 86% | 80% | 80% | 80% |
| (n =55) | RPCI stage III | 100% | 81% | 67% | 61% | 53% | 51% |
| (n =23) | RPCI stage IV | 100% | 44% | 36% | 28% | 24% | 19% |
| | SEER stage I | 100% | 98.20% | 95.30% | 93.50% | 92.10% | 90.70% |
| | SEER stage II | 100% | 92.70% | 79.20% | 72.30% | 68.50% | 65.70% |
| | SEER Stage III | 100% | 83.80% | 67.80% | 59.50% | 55.30% | 52.20% |
| | SEER stage IV | 100% | 48% | 28.40% | 21.10% | 18.30% | 16% |

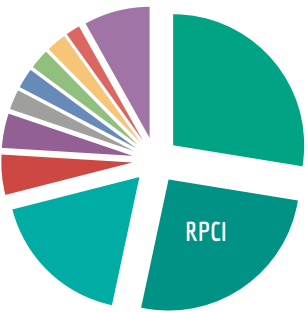
American Joint Commission on Cancer (AJCC) Stage I-IV Cervical Cancer

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data - Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

OVARIAN

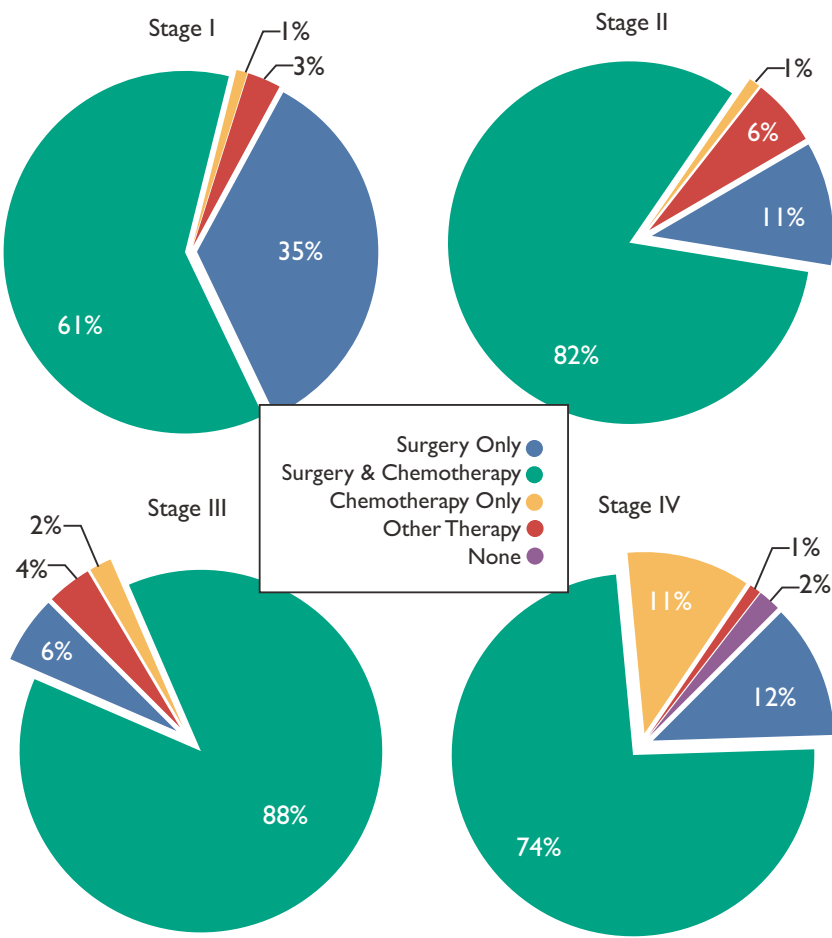
CY 2012 Inpatient Market Share by Hospital - OVARIAN

The information in the graph to the right provides WNY Inpatient market share data based on NYS SPARCS data. It shows that Roswell Park Cancer Institute treated 26 percent of cases requiring hospital stays in 2012.

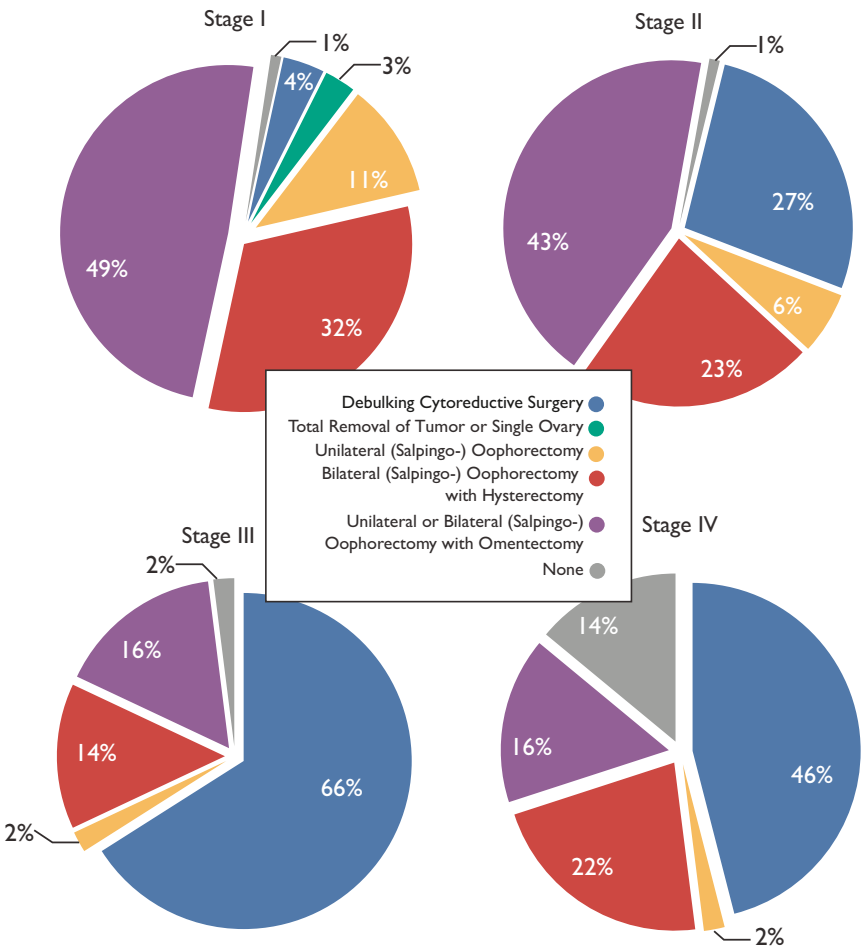


26%
Inpatient
Market Share

First-Course Treatment

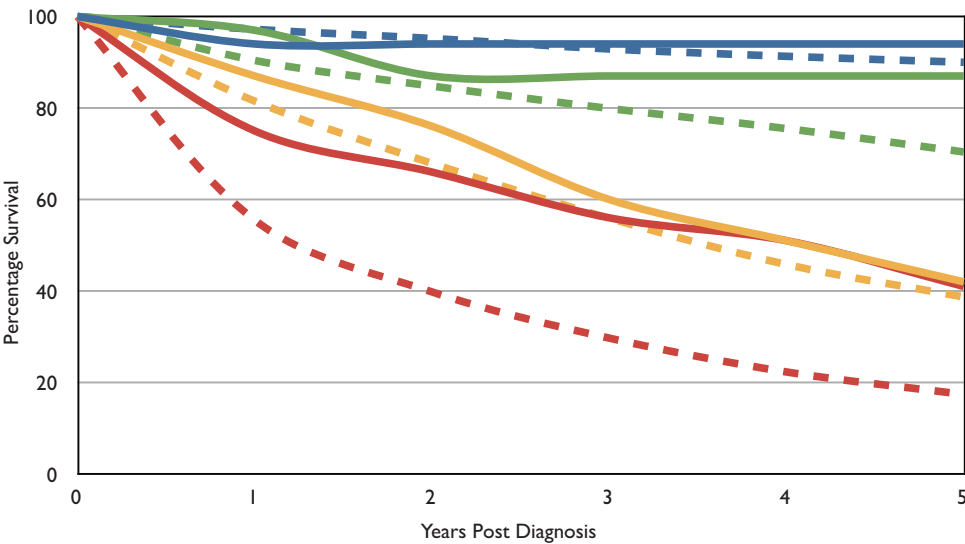


First-Course Surgery



Survival Data

Five-Year Survival, Ovarian Cancer, Stages I, II, III & IV
Cases Diagnosed (2004-2010)



— RPCI stage I — RPCI stage II — RPCI stage III — RPCI stage IV
- - - SEER stage I - - - SEER stage II - - - SEER stage III - - - SEER stage IV

| | | 0 | 1 | 2 | 3 | 4 | 5 |
|---------|----------------|------|--------|--------|--------|--------|--------|
| (n=92) | RPCI stage I | 100% | 94% | 94% | 94% | 94% | 94% |
| (n=45) | RPCI stage II | 100% | 97% | 87% | 87% | 87% | 87% |
| (n=173) | RPCI stage III | 100% | 87% | 76% | 60% | 51% | 42% |
| (n=88) | RPCI stage IV | 100% | 75% | 66% | 56% | 51% | 41% |
| | SEER stage I | 100% | 97.20% | 95.20% | 92.90% | 91.30% | 90.00% |
| | SEER stage II | 100% | 90.40% | 84.80% | 79.90% | 75.50% | 70.40% |
| | SEER Stage III | 100% | 81.50% | 67.90% | 55.90% | 45.80% | 38.70% |
| | SEER stage IV | 100% | 55.50% | 39.80% | 29.70% | 22.30% | 17.40% |

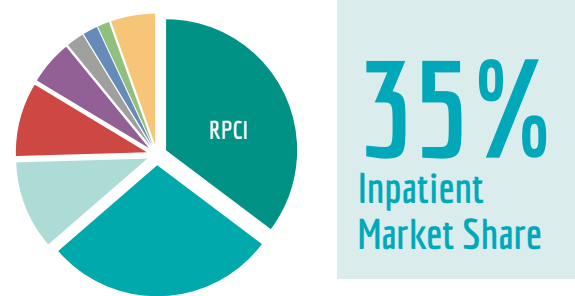
American Joint Commission on Cancer (AJCC) Stage I-IV Ovarian Cancer

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data - Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

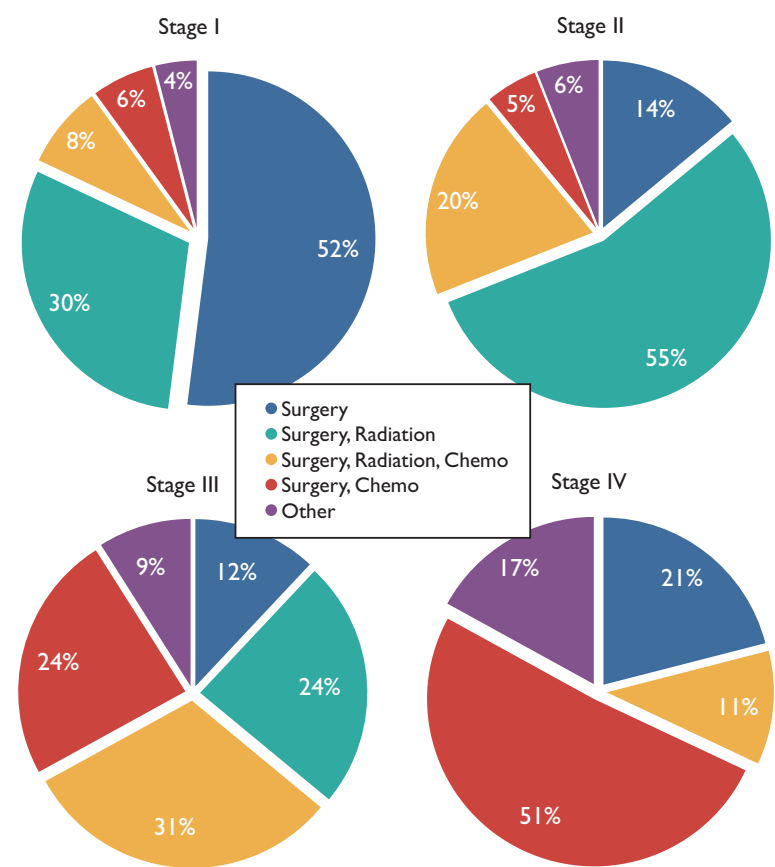
UTERINE

CY 2012 Inpatient Market Share by Hospital - UTERINE

The information in the graph to the right provides WNY inpatient market share data based on NYS SPARCS data. It shows that Roswell Park Cancer Institute treated 35 percent of all WNY cases requiring hospital stays in 2012.

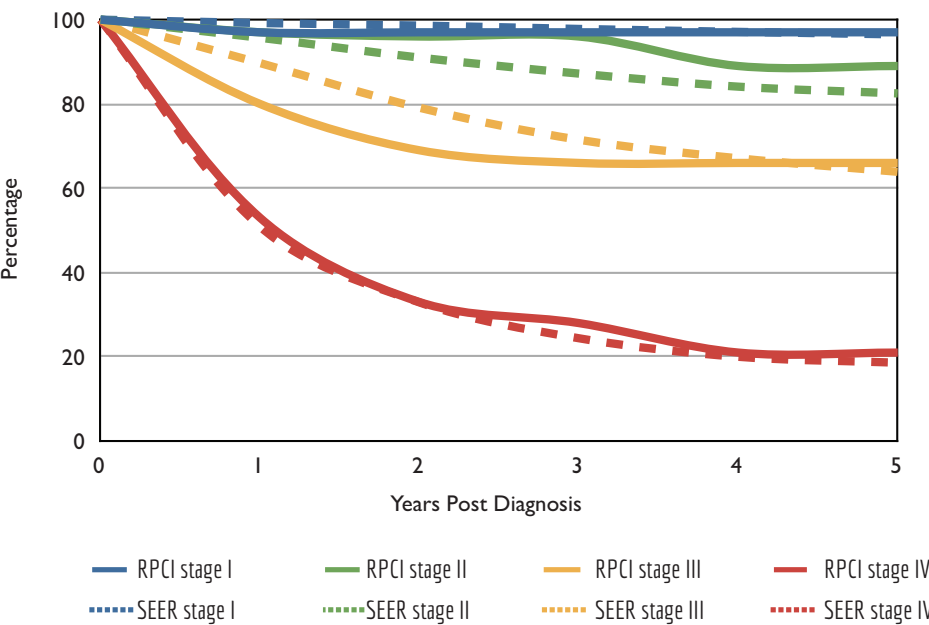


Treatment Received by Patients with Uterine Cancer



Survival Data

Five-Year Survival, Uterine Cancer, Stages I, II, III & IV
Cases Diagnosed (2004-2010)



| | 0 | 1 | 2 | 3 | 4 | 5 |
|------------------------|------|--------|--------|--------|--------|--------|
| (n =537) RPCI stage I | 100% | 97% | 97% | 97% | 97% | 97% |
| (n =67) RPCI stage II | 100% | 97% | 96% | 96% | 89% | 89% |
| (n =93) RPCI stage III | 100% | 80% | 69% | 66% | 66% | 66% |
| (n =60) RPCI stage IV | 100% | 53% | 33% | 28% | 21% | 21% |
| SEER stage I | 100% | 99.20% | 98.60% | 97.80% | 97.10% | 96.50% |
| SEER stage II | 100% | 95.70% | 91% | 87.20% | 84.10% | 82.50% |
| SEER Stage III | 100% | 89.70% | 79.10% | 71.50% | 67.10% | 63.90% |
| SEER stage IV | 100% | 50.90% | 32.90% | 24.40% | 20% | 18.60% |

American Joint Commission on Cancer (AJCC) Stage I-IV Uterine Cancer

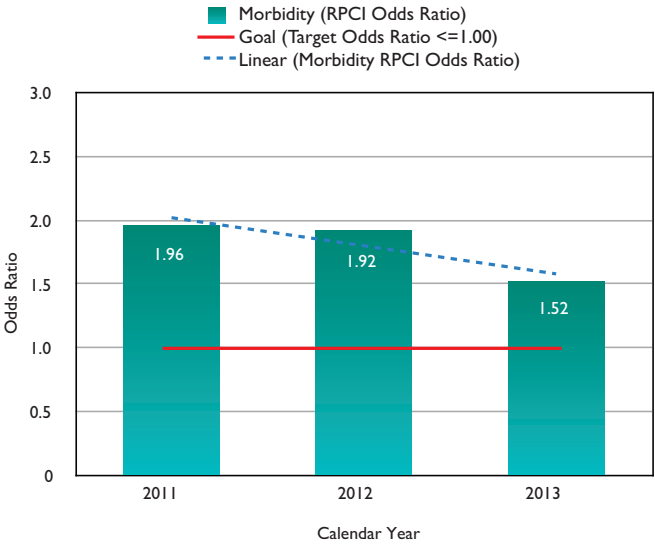
Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

Quality Metrics

Roswell Park Cancer Institute uses American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP®) measures to monitor and improve surgical care and outcomes.

Morbidity

Overall morbidity in patients undergoing a primary gynecological procedure has declined from 2011 to 2013. Although the odds ratio is still above the expected 1.00, the odds ratio was at a high of 1.96 in 2011 and is now down to 1.52 in 2013. This is a reflection of efforts to reduce overall postoperative complications before, during and after surgery.

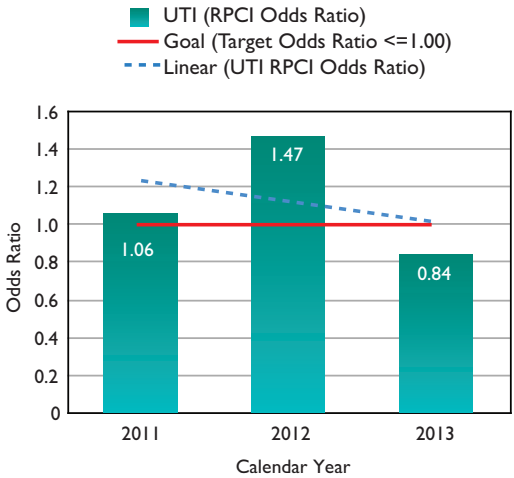


| Time Period | Procedures | Morbidity Rate | Morbidity Odds Ratio* | GOAL/Target Odds Ratio | Morbidity Confidence Interval |
|-------------|------------|----------------|-----------------------|------------------------|-------------------------------|
| CY 2011 | 119 | 19.33% | 1.96 | <=1.00 | 1.26-3.05 |
| CY 2012 | 313 | 15.65% | 1.92 | <=1.00 | 1.39-2.65 |
| CY 2013 | 297 | 12.12% | 1.52 | <=1.00 | 1.07-2.17 |

Data source:
American College of Surgeons (National Surgical Quality Improvement Program)

Urinary Tract Infections (UTI)

Postoperative urinary tract infections have declined from odds ratio of 1.47 in 2012 to 0.84 for the year 2013. In 2013, the Surgical Gynecology Service has achieved success in reducing the amount of time a Foley catheter stays in the patient postoperatively. The interdisciplinary efforts by nurses and physicians to achieve quality care for Roswell Park patients are reflected in the reduction of urinary tract infections from Foley catheters.

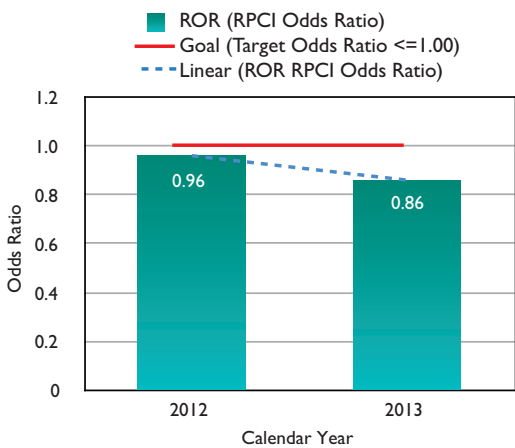


| Time Period | Procedures Reviewed | UTI Rate | UTI Odds Ratio | Goal/Target Odds Ratio | UTI Confidence Interval |
|-------------|---------------------|----------|----------------|------------------------|-------------------------|
| CY 2011 | 119 | 2.52% | 1.06 | <=1.00 | 0.44-2.54 |
| CY 2012 | 312 | 3.53% | 1.47 | <=1.00 | 0.82-2.62 |
| CY 2013 | 295 | 1.69% | 0.84 | <=1.00 | 0.43-1.65 |

Data Source: Source: American college of Surgeons (National Surgical Quality Improvement Program)

Return to the OR (ROR)

Postoperative returns to the operating room within 30 days of the primary operative procedure, as reported by NSQIP, are additional necessary procedures performed due to complications from the primary procedure. The Surgical Gynecology Service has reduced this occurrence from 0.96 in 2012 to 0.86 in 2013. In 2013, the NSQIP Semi-Annual Report (SAR) gives the service an Exemplary Rating of 0.86 in comparison with other academic teaching facilities of a similar size.



| Time Period | Procedures Reviewed | ROR Rate | ROR Odds Ratio | Goal/Target Odds Ratio | ROR Confidence Interval |
|-------------|---------------------|----------|----------------|------------------------|-------------------------|
| CY 2012 | 313 | 1.28% | 0.96 | <=1.00 | 0.71-1.30 |
| CY 2013 | 297 | 1.01% | 0.86 | <=1.00 | 0.56-1.34 |

*The odds ratio compares the results of one hospital to other hospitals participating in NSQIP. An odds ratio greater than 1.0 implies that the event is more likely, and if less than 1.0 it would be less likely to occur. The confidence interval (CI) tells us whether the odds ratio is statistically different than the other hospitals in NSQIP. If the confidence interval does not overlap 1.0 the outcome would be considered an outlier. Any confidence interval that includes 1.0 would be designated "as expected" by NSQIP.

Data source:
American College of Surgeons (National Surgical Quality Improvement Program)

SARCOMA AND MELANOMA

Introduction

The goal of the Roswell Park Cancer Institute (RPCI) Melanoma and Sarcoma Program is to deliver multidisciplinary state-of-the-art care and long-term follow-up for patients with these tumors and to promote both basic science and clinical research to improve cancer treatment. One of the strengths of this program is the multidisciplinary discussion of all complex cases, including review of all pathology and diagnostic imaging, prior to formulating an individualized treatment plan.

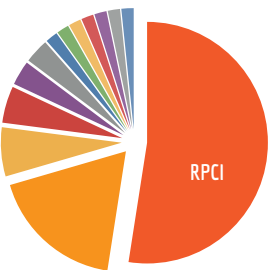
RPCI's Sarcoma and Melanoma Program provides comprehensive, individualized cancer care using a multidisciplinary approach to patients diagnosed with sarcoma and melanoma. Annually, over 500 patients with sarcoma and melanoma are evaluated, resulting in over 500 chemo infusion visits and over 300 procedures at RPCI.

SOFT TISSUE SARCOMA

For soft tissue sarcomas, our experts emphasize multimodality therapy (surgical resection combined with external beam radiation therapy and/or chemotherapy) to provide a high rate of local tumor control while avoiding amputation. In appropriate patients, RPCI has the unique capability to deliver intraoperative brachytherapy radiation in a specially designed operating room. Equally important in the treatment of sarcoma patients are reconstruction following surgical resection and functional rehabilitation. The latest soft tissue reconstructive techniques are available to provide an acceptable aesthetic and functional outcome. RPCI's Physical Therapy Department is well staffed to meet the full range of rehabilitative needs. Patients with advanced disease have access to systemic chemotherapy and are also evaluated for possible metastasectomy of isolated disease. Clinical research in soft tissue sarcomas includes design of and participation in national clinical trials seeking to improve survival in these patients and an assessment of effect and cost of follow-up strategies on survival of patients with sarcomas. In addition to soft tissue sarcomas, we treat all other soft tissue neoplasms, such as desmoid/aggressive fibromatosis, dermatofibrosarcoma protuberans (DFSP), and neurofibroma/schwannoma.

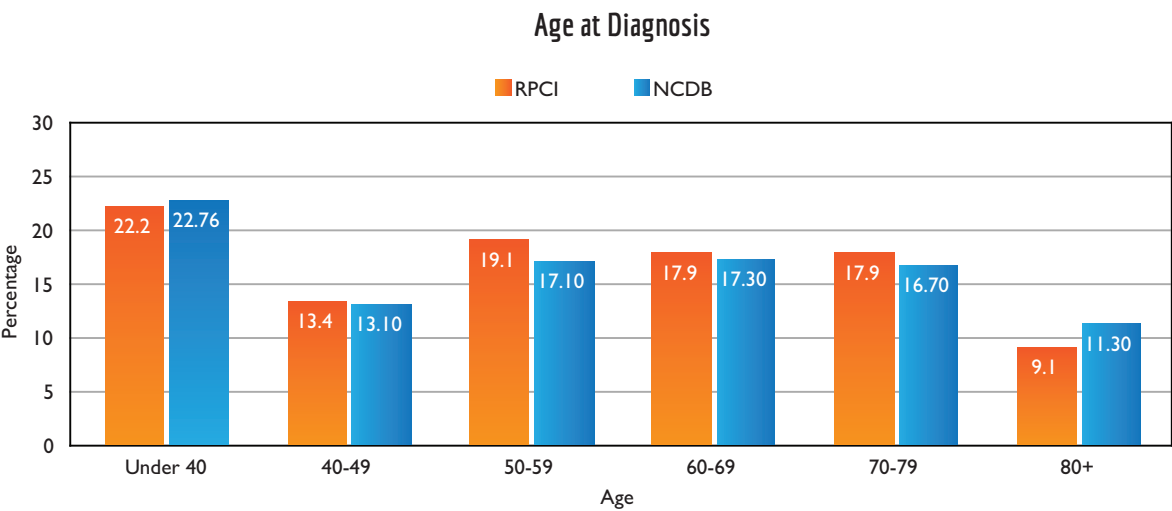
CY 2012 Inpatient Market Share by Hospital - Soft Tissue Sarcoma

The information in the graph to the right provides WNY inpatient market share data based on NYS SPARCS data. It shows that Roswell Park Cancer Institute treated 52 percent of all WNY cases requiring hospital stays in 2012.

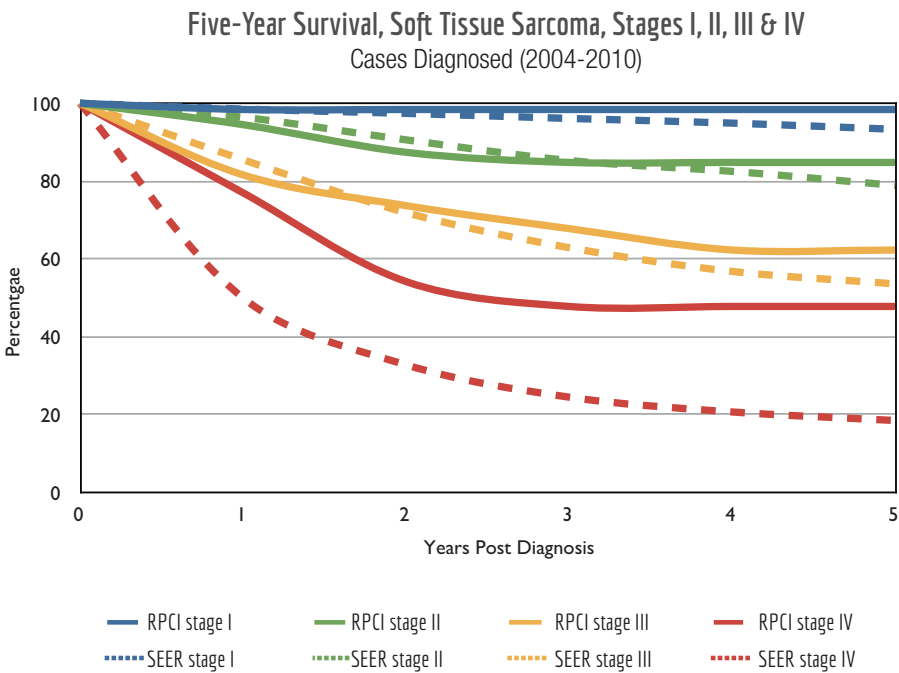


52%
Inpatient
Market Share

Our Patients



Survival Data



MELANOMA

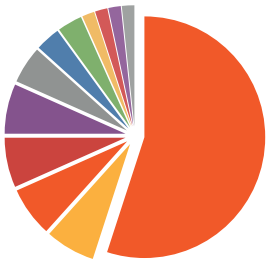
RPCI's Melanoma Program provides a full range of therapeutic options, including excision of the primary tumor, lymphadenectomy, and resection of isolated metastatic disease. It was the first center in the area to implement sentinel lymph node biopsy for nodal staging. Patients with more advanced disease have access to promising national and local protocols evaluating innovative chemotherapy and tumor vaccines in addition to more traditional biotherapeutic agents (interferon alpha, interleukin-2, etc.). The Melanoma Program is the only one in the region to offer both isolated limb perfusion (ILP) and isolated limb infusion (ILI) for the treatment of extremity in-transit melanoma, Merkel cell carcinoma, and other advanced extremity tumors. For patients with lymphedema following lymphadenectomy, radiation, or any other cause, our Physical Therapy Department has a dedicated Lymphedema Management Service to prevent, evaluate, and treat lymphedema. In addition to melanoma, our physicians have expertise in the treatment of less-common cutaneous malignancies, such as aggressive squamous cell carcinoma, Merkel cell carcinoma, and eccrine or sebaceous tumors.

American Joint Commission on Cancer (AJCC) Stage I-IV Soft Tissue Sarcoma

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

CY 2012 Inpatient Market Share by Hospital - Melanoma

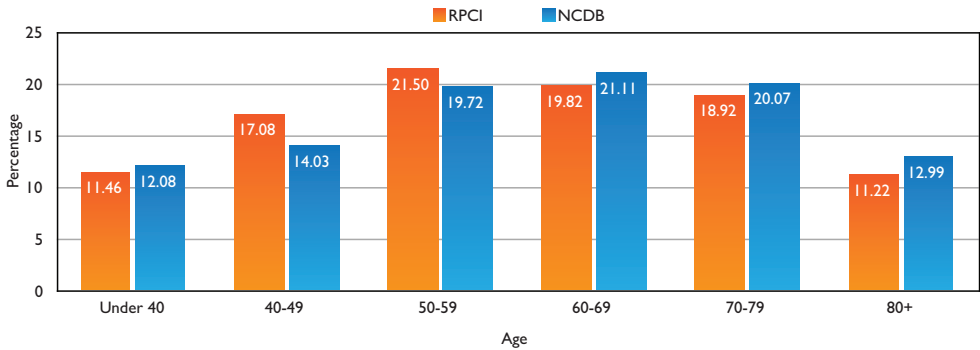
The information in the graph to the right provides WNY inpatient market share data based on NYS SPARCS data. It shows that Roswell Park Cancer Institute treated 55 percent of all WNY cases requiring hospital stays in 2012.



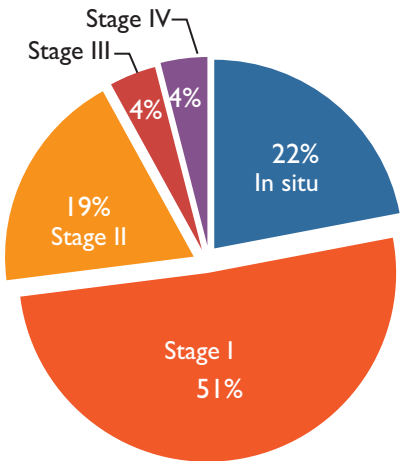
55%
Inpatient
Market Share

Our Patients

Age at Diagnosis

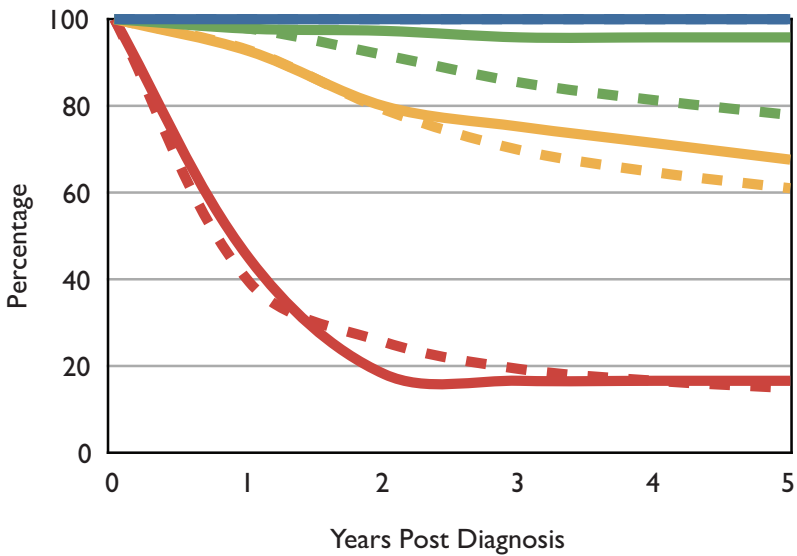


Stage at Diagnosis



Survival Data

Five-Year Survival, Melanoma, Stages I, II, III & IV
Cases Diagnosed (2004-2010)



| | | 0 | 1 | 2 | 3 | 4 | 5 |
|----------|----------------|------|--------|--------|--------|--------|--------|
| (n =801) | RPCI stage I | 100% | 100% | 100% | 100% | 100% | 100% |
| | SEER stage I | 100% | 100% | 100% | 100% | 100% | 100% |
| (n =279) | RPCI stage II | 100% | 97.80% | 97.30% | 95.80% | 95.80% | 95.80% |
| | SEER stage II | 100% | 97.80% | 91.70% | 85.40% | 81.30% | 77.90% |
| (n =141) | RPCI stage III | 100% | 92.60% | 79.90% | 75.20% | 71.40% | 67.60% |
| | SEER stage III | 100% | 92.80% | 79.10% | 69.80% | 64.70% | 61.00% |
| (n =53) | RPCI stage IV | 100% | 44.70% | 18.10% | 16.60% | 16.60% | 16.60% |
| | SEER stage IV | 100% | 39.30% | 25.50% | 19.30% | 16.60% | 14.90% |

American Joint Commission on Cancer (AJCC) Stage I-IV Melanoma of the Skin

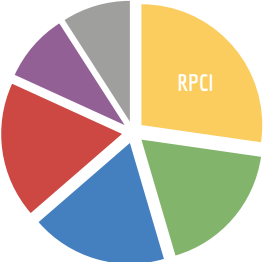
Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

THORACIC

Roswell Park Cancer Institute (RPCI) provides comprehensive care for thoracic patients. RPCI's Thoracic Program evaluates more than 1,500 new patients annually, resulting in about 700 procedures (including inpatient and outpatient), 4,500 chemotherapy visits and 10,000 office visits with RPCI care providers.

CY 2012 Inpatient Market Share by Hospital - Thoracic

The information in the graph to the right provides WNY inpatient market share data based on NYS SPARCS data. It shows that Roswell Park Cancer Institute treated 30 percent of all WNY cases requiring hospital stays in 2012.

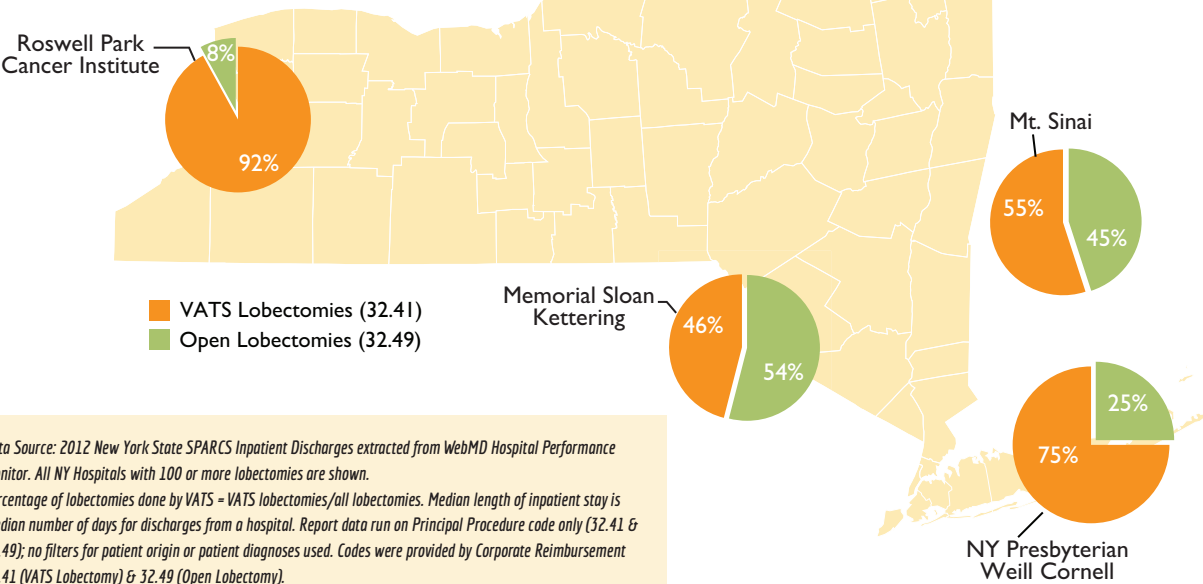


30%
Inpatient
Market Share

Non-Small Cell Lung Cancer

Lobectomy: The figure below shows that at RPCI more than 90 percent of lobectomies are performed with video-assisted-thoroscopic surgery (VATS).

New York State 2012 VATS Comparison
(Facilities with greater than 100 Lobectomies)

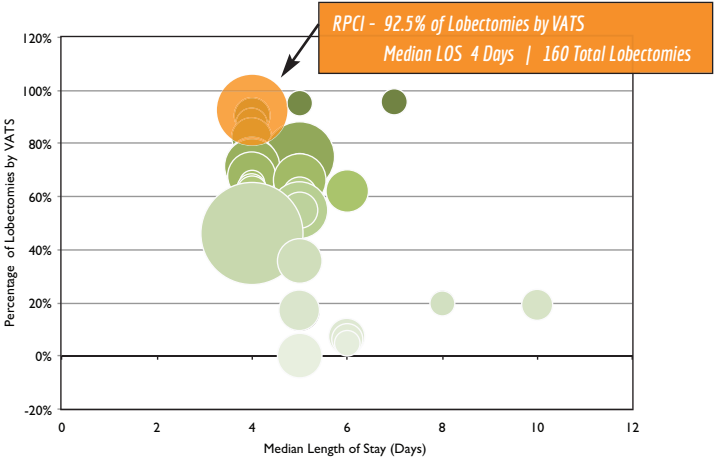


Data Source: 2012 New York State SPARCS Inpatient Discharges extracted from WebMD Hospital Performance Monitor. All NY Hospitals with 100 or more lobectomies are shown. Percentage of lobectomies done by VATS = VATS lobectomies/all lobectomies. Median length of inpatient stay is median number of days for discharges from a hospital. Report data run on Principal Procedure code only (32.41 & 32.49); no filters for patient origin or patient diagnoses used. Codes were provided by Corporate Reimbursement 32.41 (VATS Lobectomy) & 32.49 (Open Lobectomy).

New York State 2012 VATS Lobectomy Comparison

RPCI to New York State Hospitals (2012 Inpatient Data) with 20 or Greater Procedures - Median LOS

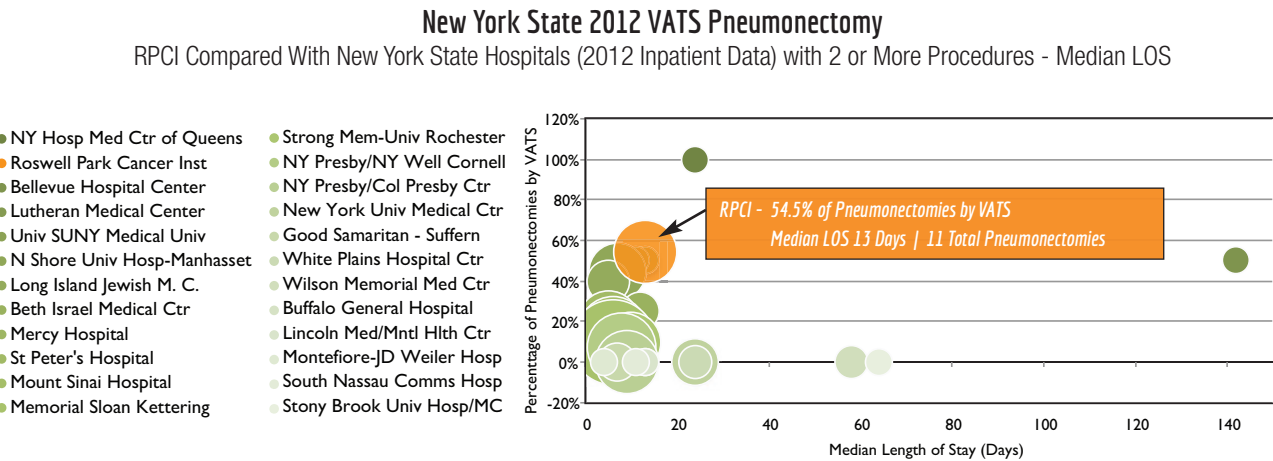
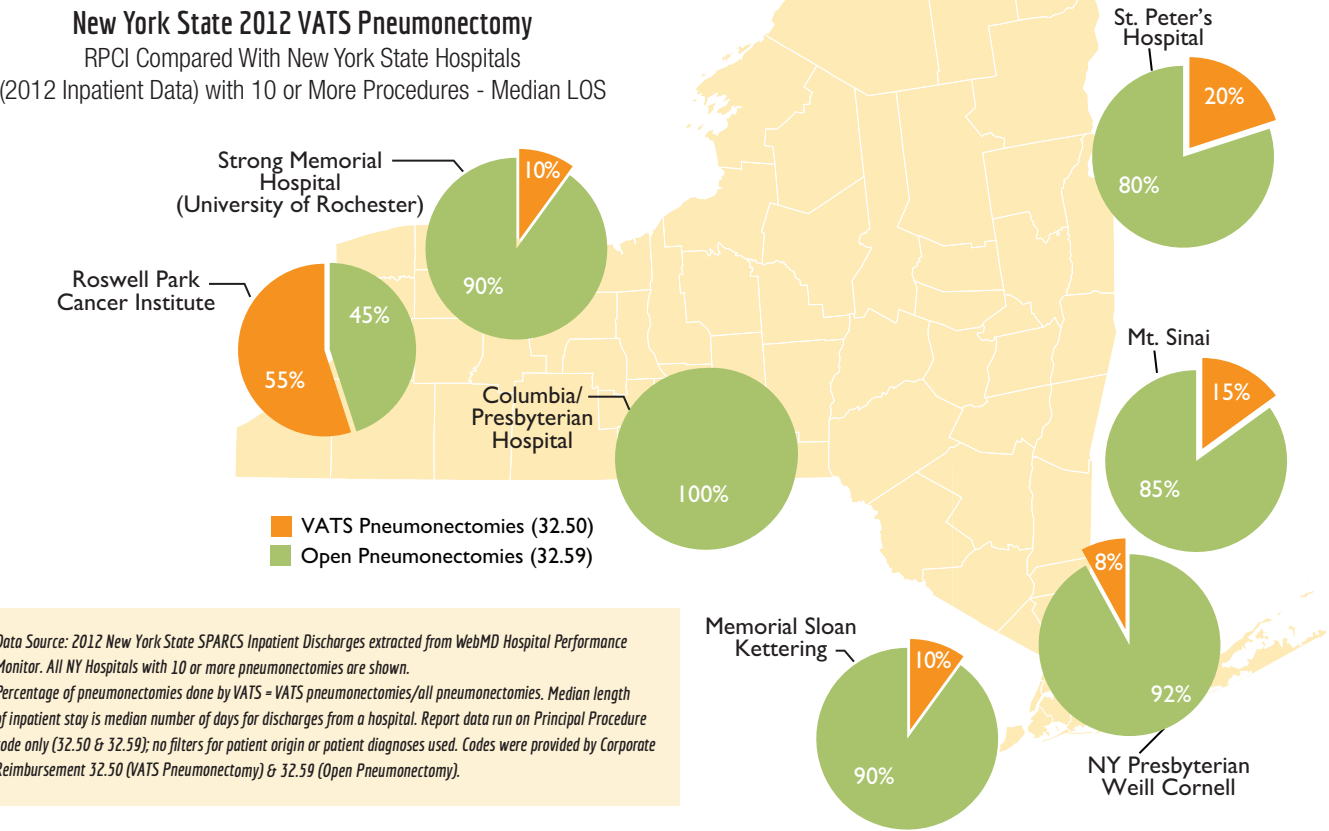
- Staten Island Univ Hosp N
- St Francis Hospitals
- Roswell Park Cancer Inst
- Long Island Jewish M. C.
- Rochester General Hospital
- Glens Falls Hospital
- NY Hosp Med Ctr of Queens
- NY Presby/NY Weill Cornell
- N Shore Univ Hosp-Manhasset
- NY Presby/Col Presby Ctr
- White Plains Hospital Ctr
- New York Univ Medical Ctr
- Strong Mem-Univ Rochester
- Beth Israel Medical Ctr
- Lenox Hill Hospital
- St Joseph's Hosp Hlth Ctr
- Albany Medical Ctr Hosp
- Maimonides Medical Center
- Mount Sinai Hospital
- SUNY Upstate Medical University
- Roosevelt Hospital
- Memorial Sloan Kettering
- Winthrop-University Hosp
- St Peter's Hospital
- Westchester Medical Ctr
- St Francis Hospital
- Stony Brook Univ Hosp/MC
- Montefiore-JD Weiler Hosp
- Ellis Hospital
- Wilson Memorial Med Ctr
- St Elizabeth Medical Ctr



The data above show that VATS results in a more timely recovery of the patient, resulting in shorter length of stay. Since RPCI performs a majority of its lobectomies using VATS, the median length of stay is shorter than at other hospitals.

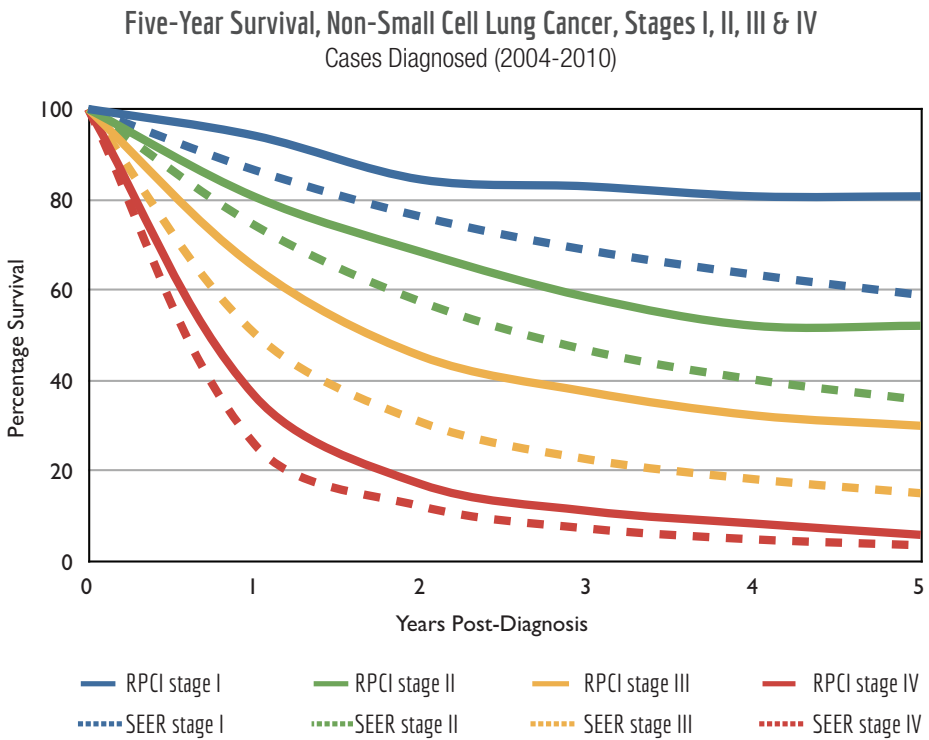
Pneumonectomy:

The illustration below shows that at RPCI 55 percent of pneumonectomies are performed with video-assisted-thoroscopic surgery (VATS).



The data above show that VATS results into speedy recovery of the patient, resulting in shorter length of stay. Because RPCI performs the majority of its pneumonectomies using VATS, the median length of stay is shorter than at other hospitals.

Survival Data



| | | 0 | 1 | 2 | 3 | 4 | 5 |
|------------|----------------|------|--------|--------|--------|--------|--------|
| (n =688) | RPCI stage I | 100% | 94.10% | 84.40% | 82.90% | 80.70% | 80.70% |
| (n =171) | RPCI stage II | 100% | 80.60% | 68.40% | 58.40% | 52.10% | 52.10% |
| (n =621) | RPCI stage III | 100% | 65.10% | 45.40% | 37.50% | 32.30% | 30.00% |
| (n =1,015) | RPCI stage IV | 100% | 36.60% | 17.10% | 11.20% | 8.40% | 5.90% |
| | SEER stage I | 100% | 86.50% | 76.20% | 68.80% | 63.40% | 58.90% |
| | SEER stage II | 100% | 74.30% | 57.40% | 46.70% | 40.20% | 35.70% |
| | SEER Stage III | 100% | 50.40% | 30.80% | 22.60% | 18.20% | 15.10% |
| | SEER stage IV | 100% | 25.90% | 12.20% | 7.30% | 4.90% | 3.60% |

American Joint Commission on Cancer (AJCC) Stage I-IV Lung Cancer

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

Quality Measures

Roswell Park Cancer Institute uses the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP®) measures. The NSQIP odds ratio for overall morbidity for the Thoracic Program was 2.53 in 2011. Through department and interdisciplinary quality-improvement efforts related to both the assessment and care of patients before and after surgeries, the overall morbidity has declined to 1.30 in 2013. Morbidity is now in the expected range when comparing RPCI's thoracic patients with patients from similar hospitals participating in NSQIP. Unplanned intubations after surgery have declined from an odds ratio of 2.35 in 2012 to 1.34 (expected range) in 2013. Pneumonia odds ratio has improved from 2.21 in 2012 to 2.19 in 2013. Roswell Park has physician-led multidisciplinary teams working on each of these metrics in the Thoracic Program.

Thoracic Program

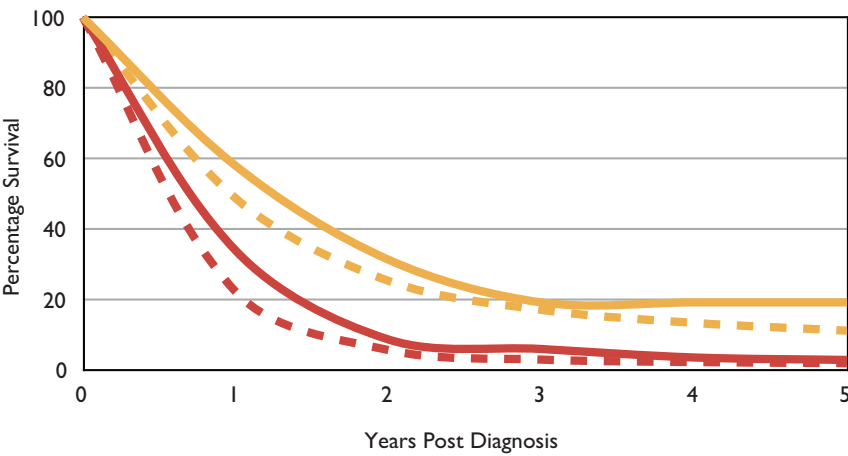
| Time Period | Procedures Reviewed | Morbidity Rate | Morbidity Odds Ratio | Morbidity Confidence Interval | Pneumonia Rate | Pneumonia Odds Ratio | Pneumonia Confidence Interval | Unplanned Intubations Rate | Unplanned Intubations Odds Ratio | Unplanned Intubations Confidence Interval |
|-------------|---------------------|----------------|----------------------|-------------------------------|----------------|----------------------|-------------------------------|----------------------------|----------------------------------|---|
| CY 2012 | 208 | 16.35% | 1.41 | 0.99-2.02 | 12.02% | 2.21 | 1.36-3.60 | 6.73% | 2.35 | 1.27-4.35 |
| CY 2013 | 242 | 11.98% | 1.3 | 0.88-1.92 | 8.58% | 2.19 | 1.32-3.64 | 3.31% | 1.34 | 0.71-2.53 |
| Goal | | | <=1.00 | | | <=1.00 | | | <=1.00 | |

The odds ratio compares the results of one hospital to other hospitals participating in NSQIP. An odds ratio greater than 1.0 implies that the event is more likely, and if less than 1.0 it would be less likely to occur. The confidence interval (CI) tells us whether the odds ratio is statistically different from the other hospitals in NSQIP. If the confidence interval does not overlap 1.0, the outcome would be considered an outlier. Any confidence interval that includes 1.0 would be designated "as expected" by NSQIP.

Data source:
American College of Surgeons (National Surgical Quality Improvement Program)

Small Cell Lung Cancer

Five-Year Survival, Small Cell Lung Cancer, Stages III & IV
Cases Diagnosed (2004-2010)



Insufficient sample size for stages I & II

— RPCI stage III — RPCI stage IV
- - - SEER stage III - - - SEER stage IV

| | | 0 | 1 | 2 | 3 | 4 | 5 |
|----------|----------------|------|--------|--------|--------|--------|--------|
| (n =106) | RPCI stage III | 100% | 57.90% | 31.30% | 19.20% | 19.20% | 19.20% |
| (n =187) | RPCI stage IV | 100% | 33.90% | 8.70% | 6.00% | 3.60% | 2.90% |
| | SEER Stage III | 100% | 48.70% | 25.30% | 17.10% | 13.40% | 11.20% |
| | SEER stage IV | 100% | 22.20% | 5.70% | 3.00% | 2.30% | 2.00% |

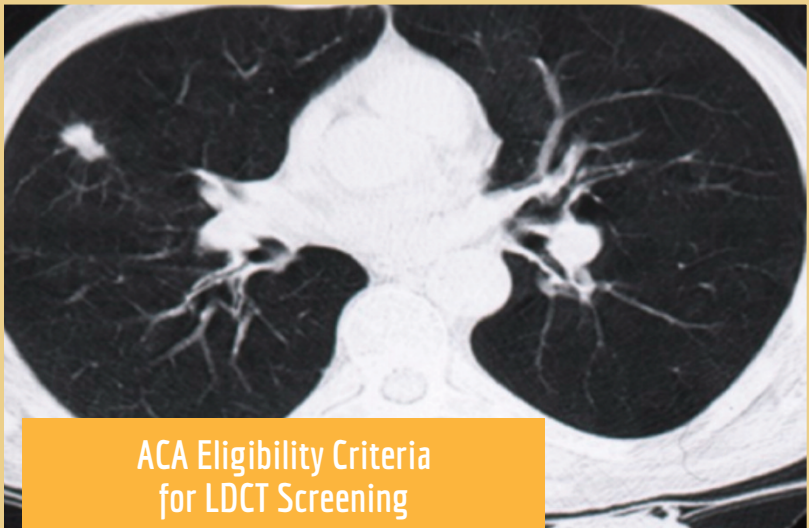
American Joint Commission on Cancer (AJCC) Stage I-IV Lung cancer

Data source:
Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (1973-2011 varying) - Linked To County Attributes - Total U.S., 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

High-Risk Lung Cancer Program

The High-Risk Lung Cancer Program (HRLC) at RPCI was established as a research program in 1998 with funding from several small grants. The program was designed to combine the results from several tests (chest radiograph (CXR), sputum cytology, non-contrast helical low-dose CT (LDCT) and bronchoscopy), using white and fluorescent light (AFB) for the detection of early lung cancers. Eligibility criteria for screening included at least two risk factors: a smoking history of at least 20 pack-years (one pack a day for 20 years) and moderate to severe chronic obstructive pulmonary disease (COPD), a personal history of aerodigestive cancer with no evidence of disease

Figure 1:
Example of Low-Dose
CT scan with a small lung
cancer detected



ACA Eligibility Criteria
for LDCT Screening

- ✓ At least 55-79 years of age
- ✓ 30 or more pack-years of cigarette smoking exposure and
- ✓ Active smoking within the last 15 years

LDCT scans, which showed that 91% of our high-risk patients have at least one lung nodule during the course of surveillance. From more than 940 AFB examinations in this program, 53% of patients had at least one premalignant lesion.

January 1, 2015, will mark the start of comprehensive lung cancer screening with LDCT under the Affordable Care Act (ACA). The decision to implement screening is based on the results of the National Lung Screening Trial (NLST), which showed a 20% reduction in lung cancer mortality with three annual LDCT scans in asymptomatic patients.

LDCT screening reduced mortality, and the stage of lung cancers detected also shifted to earlier, more treatable cancers.

for one year, confirmed asbestos-related lung disease, or a first-degree relative with a history of lung cancer. Results based on just over 200 patients showed that the combination of LDCT and AFB detected all of the cancers in this high-risk population.

In 2004, lung cancer screening with a combination of LDCT and AFB became a standard of care program at Roswell Park. In our total screened cohort of over 550 patients, we have performed over 3,500

70% of cancers were detected in Stage 0, I and II, as opposed to current trends that detect 70% of lung cancers in advanced stages.

Figure 2. The Shift in Stage of Lung Cancer With Comprehensive LDCT Screening

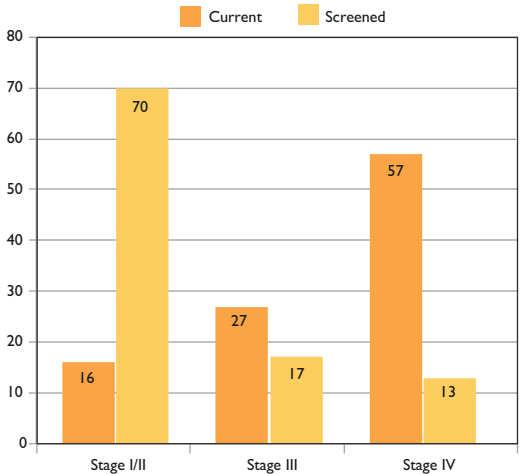
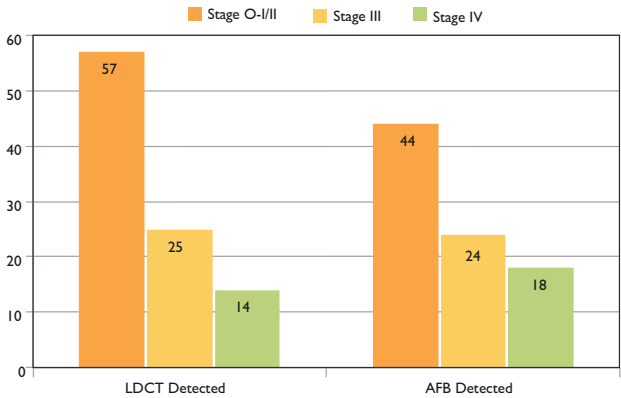


Figure 3. Proportion of Lung Cancers Detected by Stages by Screening Test



At RPCI, 57% of lung cancers detected by LDCT and 44% on AFB were earlier-stage cancers (0-II) with definitive treatment options, such as surgery and adjuvant radiation and chemotherapy.

Recommended Elements
of a Comprehensive Lung Cancer
Screening Program

| ELEMENT | RPCI |
|----------------------------|------|
| Interventional Pulmonology | ✓ |
| Diagnostic Radiology | ✓ |
| Pulmonary Pathology | ✓ |
| Medical Oncology | ✓ |
| Surgical Oncology | ✓ |
| Radiation Oncology | ✓ |
| Nuclear Medicine | ✓ |
| Smoking Cessation | ✓ |

The necessary components of a comprehensive lung cancer screening program, to meet standards set by several professional organizations, insurance companies and government agencies, include a multidisciplinary team and a state-of-the-art smoking cessation program. Our program at Roswell Park has all of these components (listed at left), including a smoking-cessation program that approaches all active smokers.

Lung cancer screening will change the epidemiology of lung cancer in the near future, making this a more treatable and survivable cancer. While screening with LDCT is not a panacea, it will afford high-risk lung cancer patients diagnosed with lung cancer more definitive treatment options and a better quality of life.

THE BLOOD & MARROW TRANSPLANT PROGRAM

Advocates for Blood and Marrow Transplant (BMT) patients suggest that when choosing a transplant center, one should consider the following:

- Does the transplant team have experience with the specific disease?
- What is the volume of transplants performed at the center?
- Is the center accredited by the Foundation for Accreditation of Cellular Therapy (FACT)?
- Is long-term follow-up available to address medical issues that may come up months or years after transplant?
- Does the program provide emotional support services to the donor, caregiver, and patient?
- How does the center’s outcomes compare to the expected patient outcomes published by the Center for International Blood and Marrow Transplants (CIBMTR)?

The BMT program at Roswell Park Cancer Institute (RPCI) brings together a multidisciplinary team of specialists in transplant, radiation, surgery, pharmacy, infectious disease, dental oncology, cardiology, pulmonary, renal, and gastrointestinal medicine plus nutrition, physical therapy, and psychosocial support. Uniquely, the BMT team also includes an epidemiologist to monitor patient outcomes and provide oversight to the program’s dedicated database. Examination of program data provides for a robust quality assurance program and affords clinicians the opportunity to make adjustments in treatments to optimize patient care. This combination of specially trained clinicians and healthcare professionals supports a wide range of transplant services, including:

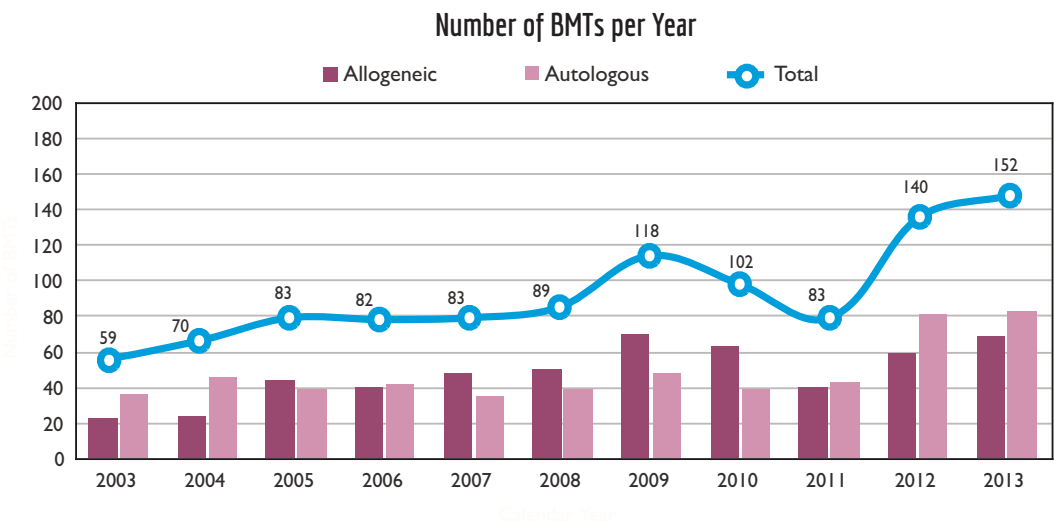
- Autologous transplantation using peripheral blood and bone marrow as the hematopoietic stem cell source
- Allogeneic transplantation (requiring a related or unrelated donor) using peripheral blood, bone marrow, or cord blood
- Reduced intensity and nonmyeloablative transplants
- Onsite blood and marrow collection and processing
- Case management and discharge planning
- A dedicated inpatient and outpatient service with expertise in the care of immune-compromised patients

BMT patients

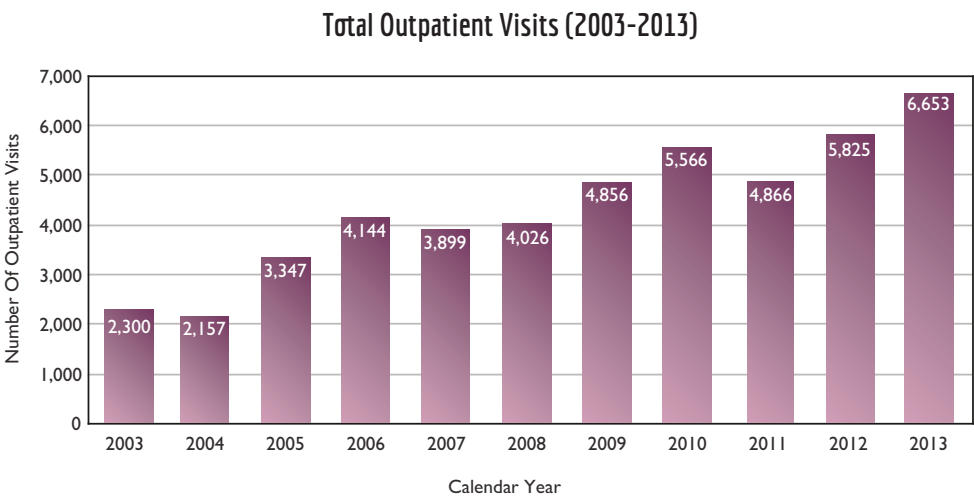
RPCI’s BMT Program successfully treats both common and rare diseases, including acute lymphoblastic and myeloid leukemias, chronic lymphocytic and myeloid leukemias, myelodysplastic syndrome, myeloproliferative disorders, multiple myeloma, amyloidosis, Hodgkin and non-Hodgkin lymphoma, anemias (including aplastic, Fanconi and Diamond-Blackfan), and selected solid tumors.

Since its inception, the BMT Program has emphasized clinical studies, including both investigator-initiated and cooperative group trials. RPCI’s status as a research institute means patients have access to care regimens that may not be available at other centers. RPCI’s BMT Program participates as a core member of the Blood and Marrow Transplant Clinic Trials Network and is an active participant in the Alliance for Clinical Trials in Oncology Foundation and the Chronic Graft Versus Host Disease Consortium. Our membership in national cooperative group research studies provides access to new treatments for our patients.

Since 1991, the BMT Program at Roswell Park Cancer Institute has performed over 1,800 transplants for more than 1,700 patients. In the last two years, 292 transplants were performed—128 allogeneic and 164 autologous.



| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|------------|------|------|------|------|------|------|------|------|------|------|------|
| Allo | 23 | 24 | 44 | 40 | 48 | 50 | 70 | 63 | 40 | 59 | 69 |
| Auto | 36 | 46 | 39 | 42 | 35 | 39 | 48 | 39 | 43 | 81 | 83 |
| Total BMTs | 59 | 70 | 83 | 82 | 83 | 89 | 118 | 102 | 83 | 140 | 152 |



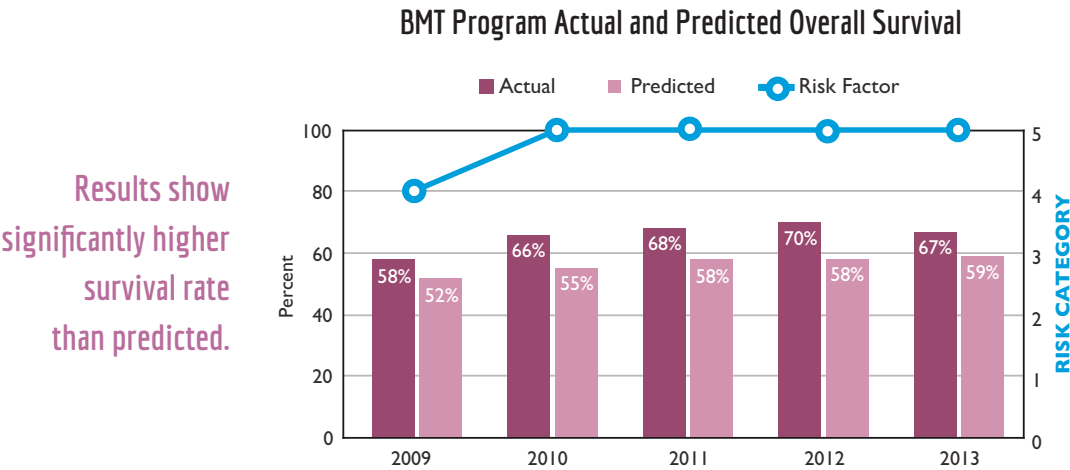
RPCI's BMT Program was first accredited by the Foundation for the Accreditation of Cellular Therapy (FACT) over a decade ago. This accreditation serves to assure patients and referring physicians that the BMT Program meets or exceeds global standards in patient care and laboratory services. In further recognition of its ability to meet high-quality transplant standards, RPCI's BMT Program has been identified as a Blue Distinction Center by the BlueCross BlueShield Association. Individually, the program's transplant physicians are members of the American Society of Blood and Marrow Transplantation (ASBMT), American Society of Hematology (ASH), American Society of Clinical Oncology (ASCO) and the American Association for Cancer Research (AACR). The program also serves as an approved donor collection center for the National Marrow and Donor Program (now Be the Match).

RPCI's BMT Program is one of a select group transplant centers with an annual survivorship clinic providing long-term medical care and support to its patients. While it is expected that patients will visit their primary care physicians and referring oncologists for general care, they are strongly encouraged to visit the program's annual survivorship clinic (offered every Friday, year-round). This unique service provides a full patient assessment and subsequent referrals to gastrointestinal, renal, pulmonary, dental, and dermatologic specialists as needed. Ultimately, the annual survivorship clinic allows the program to provide patients and their physicians with the very best in post-transplant care.

In addition to clinical and research expertise, the program recognizes the need for a network of support services. RPCI's BMT Pogram provides financial guidance and emotional support to patients, their families

and caregivers. Our financial counselors and Medicaid advocates help sort through details of insurance coverage, including coverage for participation in clinical research studies. They work with third-party payers to secure authorization for transplant and serve as the patient's advocate if coverage is denied. The BMT Program also provides emotional support through dedicated social workers. These mental health care professionals deliver reliable information and encouragement to patients and caregivers as they face the challenges related to transplant. Whether through counseling, support group referrals, or connections with community resources, the psychosocial oncology and pastoral care staff endeavors to address the psychosocial and spiritual needs of the patient and family.

Outcomes for patients treated by RPCI's BMT Program are among the best in the nation. For four consecutive years, a national report compiled by the Center for International Blood and Marrow Transplant Research (CIBMTR) shows that the one-year survival rate for RPCI's first allogeneic transplant patients was significantly higher than expected. The 2013 CIBMTR report, based on data for transplants performed between 2009 and 2011, indicates that the risk-adjusted one-year survival rate for RPCI BMT patients was superior to the predicted outcomes, a distinction achieved by only 8 percent of U.S. centers providing transplants. The CIBMTR adjusts raw data to account for the level of acuity based on disease, age, and other relevant risk factors. The CIBMTR assigned the RPCI program to the highest possible risk category, indicating the cases treated during this time period were among the most complex and difficult in the nation.



Risk categories range from 0 (lowest risk) to 5 (highest risk). Analysis prepared by the Center for International Blood and Marrow Transplant Research (CIBMTR) for patients who received a related or unrelated donor BMT (3-year rolling average). The 2013 report analyzes patients transplanted from 2009 to 2011.

The average wait time for a new patient's first appointment in the BMT service is less than two business days. If a patient needs to be seen right away, the BMT service will make it possible.

THE CENTER FOR IMMUNOTHERAPY

www.roswellpark.edu/research/center-immunotherapy

The power of the immune system holds great promise for treating human disease, as witnessed by the eradication of many deadly and crippling infectious diseases (polio, smallpox, etc.) through vaccination. We now stand in the dawn of an era where harnessing the immune system used in the fight against cancers. Recent advances demonstrate that an individual’s immune system can be activated to protect against cancer and help patients with cancer live longer.

With a strong emphasis on innovative, high-impact, phase I/II clinical research studies, Roswell Park Cancer Institute’s Center for Immunotherapy (CFI) has brought together a critical mass of clinical investigators and scientists who are focused on a wide range of cancer types. This intellectual capital—brought together with the Immune Analysis Facility (IAF), cGMP Therapeutic Cell Production Facility (TCPF), cGMP Vector Development and Production Facility (VDPF), and a support system for partnerships with industry and academic centers—has put RPCI on the fast track toward developing effective new immunotherapies. It is unusual for these complementary components of immunotherapy research to function under one umbrella in synergy, but we are proud to have accomplished this at RPCI.

The CFI is testing several strategies, including cancer vaccines, antibody therapy, cellular therapy and immune-response modifiers. To generate answers rapidly and efficiently, the CFI is equipped to conduct coordinated, parallel, phase I clinical research studies, each generating information about a single variable. While traditional phase I clinical studies gauge safety and toxicity before moving on to phase II, our phase I immunotherapy studies are outside the traditional phase I paradigm. Our studies are proof-of-concept trials, testing different variables to identify the most effective method of generating high-quality immune responses against human cancers. Our team-oriented translational science enables us to examine the depth and breadth of immune responses generated by the different variables, allowing us to take the best strategy to phase II clinical research studies in all types of cancers.

When planning new trials, CFI researchers and leadership strategically identify treatment variables to be tested, based on basic scientific and preclinical studies conducted at RPCI or other institutions. The clinical research model established in the CFI also permits detailed immune-monitoring of trials by the IAF, thereby guiding novel insights into the patient’s immune response to the innovative therapies. Conducting these studies in parallel, not in sequence, is another major strength of the Center for Immunotherapy. We generate novel understandings and insights into the impact of therapies on immune responses in humans, not in mice.

ANTIBODY THERAPY

| Title | Investigator | Phase | RPCI Study | ClinicalTrials.gov | Target Accrual | Status |
|--|------------------|-------|------------|--------------------|----------------|------------------------|
| An Open Label Phase 1B Dose-Finding Study of TRC105 in Combination with Capecitabine for Progressive or Recurrent Metastatic Breast Cancer | Dr. Ellis Levine | I | I 162809 | NCT01326481 | 30 | Closed, with follow-up |

CELLULAR THERAPY

| Title | Investigator | Phase | RPCI Study | ClinicalTrials.gov | Target Accrual | Status |
|---|---------------------|---------|------------|--------------------|----------------|------------------------|
| Cellular Infusions in Patients with Recurrent or Persistent Hematologic Malignancies after Allogeneic Stem Cell Transplant | Dr. Philip McCarthy | II | I 00703 | NCT00534118 | 50 | Closed, with follow-up |
| Phase I Study of Combination of Sipuleucel-T and Entinostat in Patients with Metastatic Castrate-Resistant Prostate Cancer | Dr. Roberto Pili | I | I 221112 | Pending | 30 | Pending |
| A Phase I/IIa, Open Label Clinical Trial Evaluating the Safety and Efficacy of Autologous T Cells Expressing Enhanced TCRs Specific for NY-ESO-1/LAGE-1 in Patients with Recurrent or Treatment-Refractory Ovarian Cancer | Dr. Kunle Odunsi | I / II | I 230612 | NCT01567891 | 6 | Active |
| A Phase 1-2 Dose Escalation Study Evaluating Safety and Feasibility of BPX-501 T Cells After Partially Mismatched, Related T Cell-Depleted HSCT | Dr. George Chen | I | PH 251514 | NCT01744223 | 3 | Pending |
| A Phase I/IIa Study of TGFβ Blockade in TCR-Engineered T-Cell Cancer Immunotherapy in Patients with Advanced Malignancies | Dr. Kunle Odunsi | I / IIa | Pending | Pending | Pending | Pending |

| IMMUNOMODULATORY | | | | | | |
|---|--------------------|---------|------------|--------------------|----------------|------------------------|
| Title | Investigator | Phase | RPCI Study | ClinicalTrials.gov | Target Accrual | Status |
| A Phase 3, Randomized, Double-Blind, Multicenter Study Comparing Oral MLN9708 Plus Lenalidomide and Dexamethasone Versus Placebo Plus Lenalidomide and Dexamethasone in Adult Patients with Relapsed and/or Refractory Multiple Myeloma | Dr. Sarah Holstein | III | PH 221012 | NCT01564537 | 20 | Closed, with treatment |
| A Phase 3, Randomized, Double-Blind, Multicenter Study Comparing Oral MLN9708 Plus Lenalidomide and Dexamethasone Versus Placebo Plus Lenalidomide and Dexamethasone in Adult Patients with Newly Diagnosed Multiple Myeloma | Dr. Sarah Holstein | III | PH 236713 | NCT01850524 | 10 | Active |
| A Phase 1 Study to Evaluate the Safety and Tolerability of Anti-PD-L1, MEDI4736, in Combination with Tremelimumab in Subjects with Advanced Solid Tumors | Dr. Kunle Odunsi | I | I 243813 | NCT01975831 | 30 | Active |
| A Phase I/IIb Study of DEC205mAb-NY-ESO-1 Fusion Protein (CDX-1401) Given with Adjuvant Poly-ICLC in Combination with INCB024360 for Patients in Remission with Epithelial Ovarian, Fallopian Tube, or Primary Peritoneal Carcinoma Whose Tumors Express NY-ESO-1 or LAGE-1 Antigen | Dr. Kunle Odunsi | I / IIb | I 248613 | NCT02166905 | 92 | Active |
| A Pilot Study of the Immunological Effects of Neo-Adjuvant INCB024360 in Patients with Epithelial Ovarian, Fallopian Tube or Primary Peritoneal Carcinoma | Dr. Kunle Odunsi | I | I 248013 | NCT02042430 | 6 | Active |
| A Phase 1 Study to Evaluate the Safety and Pharmacokinetic Profile of CBLB502 in Patients with Advanced Cancers | Dr. Alex Adjei | I | I 196111 | NCT01527136 | 66 | Active |
| A Randomized Phase III Study Comparing Conventional Dose Treatment Using a Combination of Lenalidomide, Bortezomib and Dexamethasone (RVD) to High-Dose Treatment with Peripheral Stem Cell Transplant in the Initial Management of Myeloma in Patients up to 65 Years of Age | Dr. Sarah Holstein | III | I 210611 | NCT01208662 | 25 | Active |

| VACCINE | | | | | | |
|--|-------------------------|-------|------------|--------------------|----------------|------------------------|
| Title | Investigator | Phase | RPCI Study | ClinicalTrials.gov | Target Accrual | Status |
| Phase 1 Study of Safety, Tolerability and Immunological Effects of SVN53-67/M57-KLH in Patients with Survivin-Positive Malignant Gliomas | Dr. Robert Fenstermaker | I | I 171010 | NCT01250470 | 9 | Closed, with treatment |
| A Phase 1 Study of DEC205mAb-NY-ESO-1 Fusion Protein (CDX-1401) Given with Adjuvant PolyICLC in Conjunction with 5-Aza-2'Deoxycytidine (Decitabine) in Patients with MDS or Low Blast Count AML | Dr. Elizabeth Griffiths | I | I 227712 | NCT01834248 | 15 | Active |
| A Phase 1 Open Label, Multicenter, Multiple Ascending Dose Trial Evaluating the Safety, Tolerability and Immunogenicity of Intramuscular Recombinant NY-ESO-1 Protein with GLA-SE Adjuvant in Patients with Unresectable or Metastatic Cancer Expressing NY-ESO-1 Cancer Antigen | Dr. Kunle Odunsi | I | PH 244813 | NCT02015416 | 4 | Active |
| A Phase 1 Clinical Trial of mTOR Inhibition With Rapamycin for Enhancing Intranodal Dendritic Cell Vaccine Induced Anti-Tumor Immunity In Patients with NY-ESO-1-Expressing Solid Tumors | Dr. Kunle Odunsi | I | I 191511 | NCT01522820 | 30 | Active |
| A Phase I Trial of a Recombinant Human hsp110-gp100 Chaperone Complex Vaccine for Advanced Stage IIIB/C or IV Melanoma | Dr. John Kane | I | I 215912 | NCT01744171 | 20 | Active |
| A Phase I Clinical Trial of mTOR Inhibition with Sirolimus for Enhancing ALVAC(2)-NY-ESO-1(M)/TRICOM Vaccine-Induced Anti-Tumor Immunity in Ovarian, Fallopian Tube and Primary Peritoneal Cancer | Dr. Kunle Odunsi | I | 199911 | NCT01536054 | 12 | Active |

SPORE

www.roswellpark.edu/research/rpci-upci-ovarian-cancer-spore

RPCI-UPCI Ovarian Cancer SPORE

Specialized Programs of Research Excellence (SPORE) grants are a cornerstone of the National Cancer Institute's efforts to promote collaborative, interdisciplinary translational cancer research. SPORE grants involve both basic and clinical/applied scientists and support projects that will result in new and diverse approaches to the prevention, early detection, diagnosis and treatment of human cancers. Each SPORE is focused on a specific organ site, such as ovarian, breast or lung cancer, or on a group of highly related cancers, such as gastrointestinal cancers and sarcomas. SPOREs are designed to enable the rapid and efficient movement of basic scientific findings into clinical settings, as well as to determine the biological basis for observations made in individuals with cancer or in populations at risk for cancer. SPOREs are required to reach a human endpoint within the five-year funding period. The objective for all SPOREs is to reduce cancer incidence and mortality, and to improve survival and quality of life for cancer patients.

The Roswell Park Cancer Institute (RPCI) and University of Pittsburgh Cancer Institute (UPCI) Ovarian Cancer SPORE is a partnership between these two large and mature comprehensive cancer centers recognized as national leaders in the field of ovarian cancer. The RPCI-UPCI Ovarian Cancer SPORE aims to reduce the morbidity and mortality of ovarian cancer through innovative translational research.

The underlying foundation of the RPCI-UPCI Ovarian Cancer SPORE grant is the RPCI Gynecological Cancer Disease Site Research Group (DSRG), co-led by Dr. Kunle Odunsi and Dr. Kirsten Moysich. DSRGs were established at RPCI in 2005 to bring together scientists and clinicians with common interests in a smaller setting that encourages interaction and discussion. DSRGs meet monthly to generate novel research concepts, prioritize clinical trials and the use of clinically obtained tissues, and allocate tissue specimens to high-priority research. The GYN DSRG has focused on ovarian cancer research and has become a research engine that attracts scientists from several disciplines, which has led to a rich program of translational ovarian cancer research.

The RPCI DSRG and the UPCI investigators have established a strong collaboration that spans almost 10 years. Consequently, RPCI investigators (led by Dr. Odunsi, Principal Investigator for the RPCI-UPCI Ovarian Cancer SPORE application, and Dr. Moysich, Co-Principal Investigator) have worked closely with UPCI researchers (led by Dr. Robert Edwards, Co-Principal Investigator, and Dr. Francesmary Modugno) in developing this comprehensive, translational approach to improving survival for ovarian cancer patients.

The RPCI-UPCI Ovarian Cancer SPORE includes four individual research projects, four supportive cores, and developmental research and career development programs. It brings together basic and applied investigators to conduct innovative and diverse translational investigations aimed at risk stratification, treatment of primary and recurrent ovarian cancer, and prevention of relapse in patients in remission. The four projects have been carefully designed to have significant potential to change clinical practice paradigms in ovarian cancer within five years. The theme of the program uniquely reflects immune-based approaches in the etiology, prognosis and treatment of patients with ovarian cancer.

The results of the research proposed by the RPCI-UPCI Ovarian Cancer SPORE as a whole will have a long-lasting impact on the outcome of ovarian cancer patients in a variety of clinical presentations. The varied immunologic approaches in the four first-in-human studies proposed will lead to:

1. Improved response rates and outcomes in patients newly diagnosed with ovarian cancer and those with relapsed chemoresistant disease
2. The development of novel strategies to lengthen remission rates in ovarian cancer patients with recurrent disease
3. Risk classification for ovarian cancer development and prognosis
4. Identification of factors that may interfere with the efficacy of immunotherapeutic treatment approaches

The RPCI-UPCI Ovarian Cancer SPORE is relevant to public health because each of the projects will have a direct impact on risk assessment, prognostic classification or targeted therapy for prevention and treatment of primary or recurrent ovarian cancer.

The Patient Advocacy Committee assists in collaborating with established advocate networks in Western New York, Pittsburgh and nationally to enhance minority participation in all aspects of the RPCI-UPCI Ovarian Cancer SPORE, and to ensure that the concerns of ovarian cancer patients, survivors and their families are addressed.

CENTER FOR PERSONALIZED MEDICINE

www.roswellpark.edu/research/center-personalized-medicine

This is the future of medicine, not just in oncology but across all diseases."

- Candace S. Johnson, PhD
President and CEO
Cancer Center Director
Chair, Pharmacology and Therapeutics
Wallace Chair in Translational Research

The Center for Personalized Medicine (CPM) brings together a multidisciplinary expert team in the areas of oncology, pathology, laboratory and information technology, bioinformatics, medical informatics and health care delivery to perform cutting-edge research and create the highest-quality, evidence-based genomic tests available using advanced molecular diagnostic technologies. The team is developing a comprehensive OmniSeq Target™ testing program to implement personalized genomic medicine in routine cancer care.

What is Personalized Medicine?

In a patient diagnosed with cancer, personalized medicine uses advanced laboratory technologies to identify alterations in tumor DNA to match the patient to the treatment that will work best for their specific tumor, help avoid unnecessary treatment, find out how well treatment is working, or make a prognosis.

OmniSeq Target™

OmniSeq Target™ is an advanced molecular diagnostic test for the therapeutic management of cancer patients with solid tumors that quickly, concisely and deeply informs clinicians of the care options based on their patients' unique tumor profiles. OmniSeq Target™ detects and reports actionable genomic variants, matching patients to current information about targeted therapies and clinical trials. It analyzes 23 different cancer genes for hundreds of well-characterized alterations associated with therapeutic response. OmniSeq Target™ detects specific gene mutations, translocations, and copy-number changes to identify targetable tumor alterations.

Genes were included in the test based on existing and emerging evidence of clinical utility for therapeutic management of several cancers in clinical practice, including NCCN and CAP/ASCO guidelines.

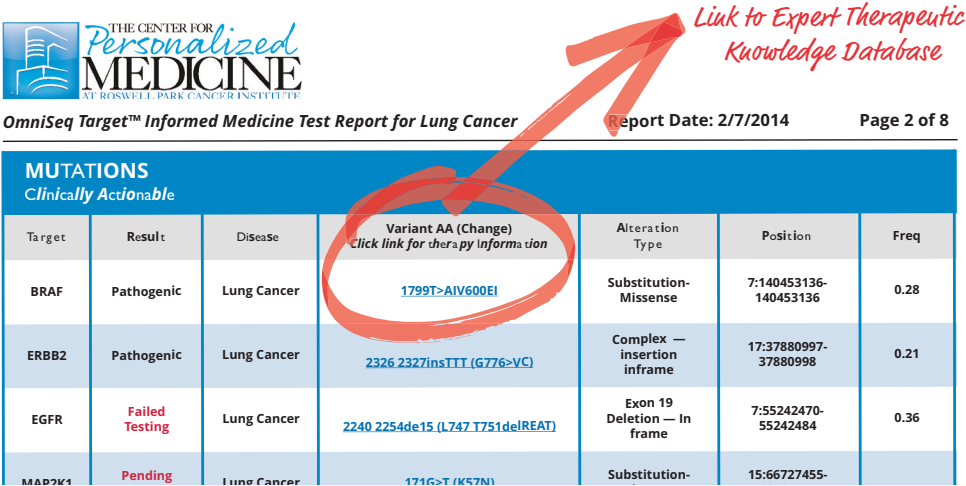
OmniSeq Target™ Genes by Level of Clinical Evidence

Each gene is analyzed for mutations and indels unless specified as ¹mutations, indels and rearrangement; ²mutations, indels and copy number/gene amplification; ³copy number/gene amplification, or ⁴rearrangement. Level of evidence represents highest level of evidence to date for at least one alteration in the gene across all disease types.

| | | | | | | |
|--------------------|--------------------|-------------------|--------|--------|--------|---|
| AKT1 | ALK ¹ | BRAF | CTNNB1 | DDR2 | EGFR | Consensus Clinical Trials Preclinical/Case Report |
| ERBB2 ² | FGFR1 ³ | GNA11 | GNAQ | JAK2 | KIT | |
| KRAS | MAP2K1 | MET ³ | NRAS | PDGFRA | PIK3CA | |
| PTEN | RET ¹ | ROS1 ⁴ | SMAD4 | SMO | | |

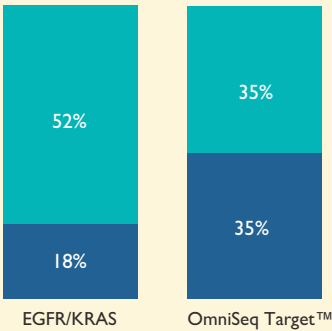
Clinical Decision Support

The complexity of advanced molecular diagnostic tests and the vast amount of data generated by high-throughput technologies is making it increasingly difficult for oncologists to interpret and act on this information. OmniSeq Target™ testing provides a comprehensive clinical report that is easy to understand and that links out to therapeutic knowledge databases to provide additional expert information about detected alterations and response to therapy.



Expected Change in Treatment

10%-20% Response (Chemotherapy)
50%-70% Response (Targeted Therapy)



Historically, lung cancer patients have been tested for only two oncogenes – EGFR and KRAS, which means only 18% of these patients have been identified as eligible for targeted therapy. With OmniSeq Target™, this number is expected to nearly double to 35% over time.

The majority of lung cancer and melanoma patients tested at Roswell Park 75% have had at least one actionable alteration detected by OmniSeq Target™.

The Center for Personalized Medicine is developing additional advanced molecular diagnostic tests using NGS and other technologies and will be making them available in the future.

CLINICAL RESEARCH SERVICES

Clinical Research Services (CRS) is a National Cancer Institute-supported resource critical to the submission and implementation of research studies associated with RPCI clinical, translational and basic science research programs. CRS staff work in collaboration with RPCI Investigators to provide oversight of the research process, the accrual of participants to research studies and the collection of a complete and accurate study dataset.

Intervention Study

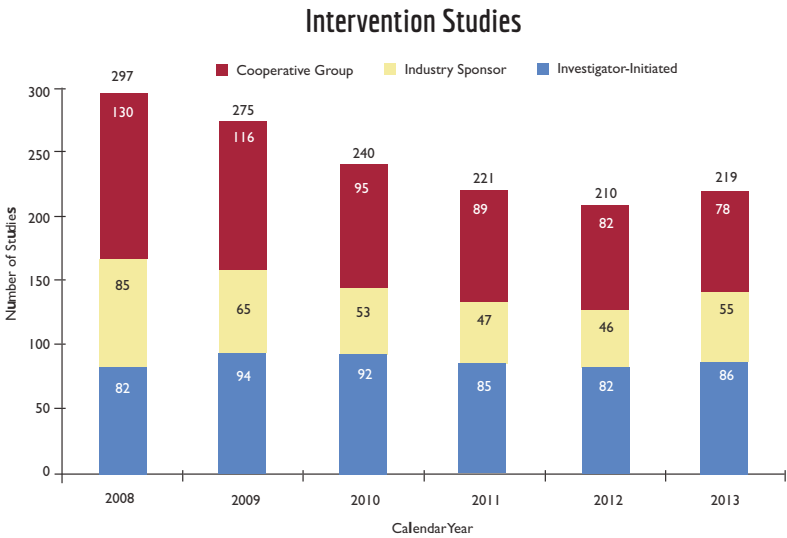
In cancer clinical research, an intervention study evaluates new cancer treatments and devices, diagnostic tools and prevention strategies and their effects on cancer patients or on individuals who are at risk for cancer.

Non-Intervention Study

A non-intervention research study is one that does not directly affect or change the study participant. Examples include observational, genetic, and survey-driven studies.

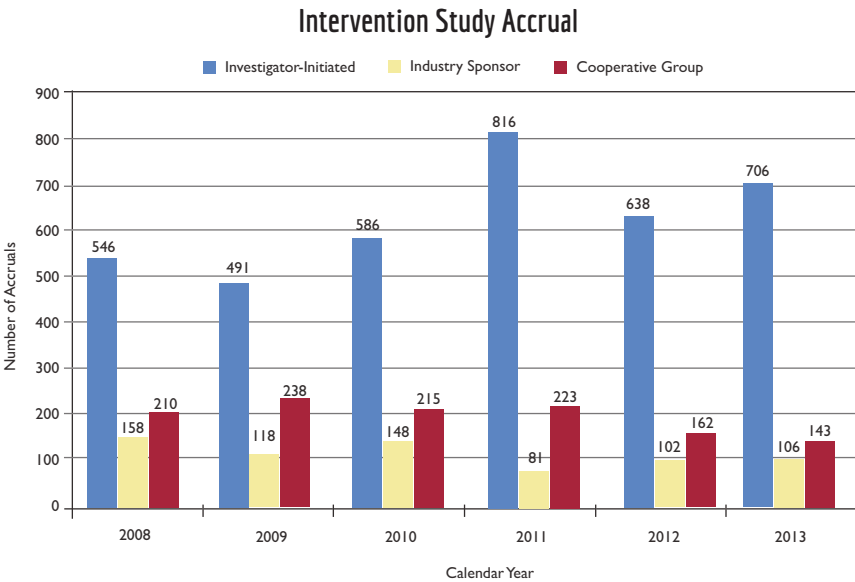
Active Clinical Research Studies

In CY2013, there were 685 active studies, compared to 659 in CY2012—a 4% increase. Two hundred nineteen (32%) were intervention, 237 (35%) were non-intervention, and 229 (33%) were existing data review (EDR) studies. Of the intervention studies, 86 (39%) were investigator-initiated, 55 (25%) were industry-sponsored, and 78 (36%) were cooperative group studies.



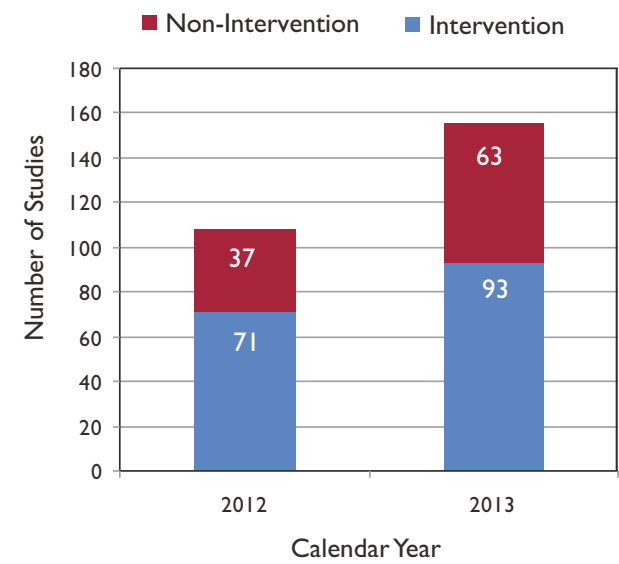
Intervention Study Accrual

In CY2013, 955 participants were enrolled to intervention studies—a 6% increase when compared to 902 enrolled in CY2012. Seventy-one (7%) were enrolled through the network sites. At RPCI, 666 (75%) of the enrolled accrual were to investigator-initiated studies, 104 (12%) to industry-sponsored studies, and 114 (13%) to cooperative group studies.



Network Affiliate Accrual

In 2013, more than 30 studies were open at network sites, enrolling 156 patients. The network has 14 active locations that include nine states and one international location.



Clinical Research Network

RPCI has established a Clinical Research Network that includes contracted affiliations with private practice physicians and investigators at other National Cancer Institute (NCI)-designated comprehensive cancer centers and medical facilities. The network allows state-of-the-art diagnostic, prevention and treatment studies conducted at RPCI to be shared with investigators outside of the Western New York area and close to the homes of study participants.

RPCI is a member site of the NCI-funded Cancer Immunotherapy Trials Network (CITN), a national multicenter group of top academic immunologists who work collaboratively to stimulate the conduct of clinical research studies of high-priority and novel cancer immunotherapies.

Currently there are approximately 20-25 phase I studies evaluating drugs that target the following proteins:

- TLR5
- Src kinases
- MET
- HSP90
- MEK
- Several angiogenesis signaling proteins
- EGFR family members
- PD-1
- PDL-1
- P13-Kinase/mTor
- WNT
- ALK
- CDK 4/6

RPCI's Phase I Program

RPCI's multidisciplinary phase I program team, under the direction of Alex A. Adjei, MD, PhD, meets weekly to review studies and patients on studies. A dedicated Clinical Research Center and a translational oncology laboratory are part of the unique aspects of this program.



Active Phase I Studies

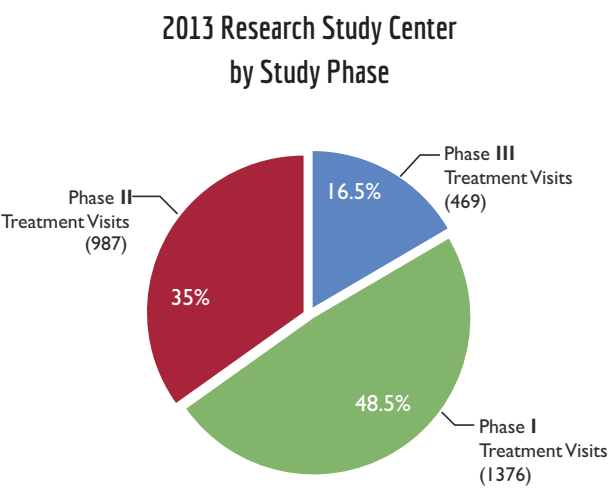
The total number of active phase I clinical research studies in 2013 was 64, and 43 were investigator-initiated. Accrual to phase I studies in 2013 was 208.

RPCI’s Clinical Research Center focuses specifically on the development of new cancer treatments. The center provides more treatment options for patients through clinical research studies, and has allowed the expansion of RPCI’s phase I program, which represents the first step toward FDA approval.

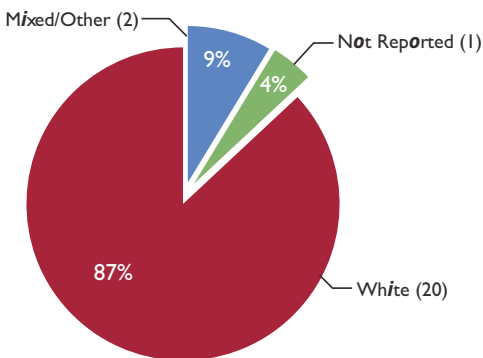
The Clinical Research Center provides the highest level of patient safety and quickly generates precise data on potential new treatments. These capabilities help attract studies sponsored by the National Cancer Institute and sponsoring pharmaceutical companies, while supporting studies launched by RPCI’s own scientists.

Clinical Research Center

The Clinical Research Center supports clinical research studies of various phases. In CY2013, there were 1376 phase I patient treatment visits, 987 phase II patient treatment visits, and 469 phase III patient treatment visits. The total number of patient visits in CY2013 was 4288; the average patient wait time was seven minutes and the average length of a phase I treatment visit was six hours, four minutes.



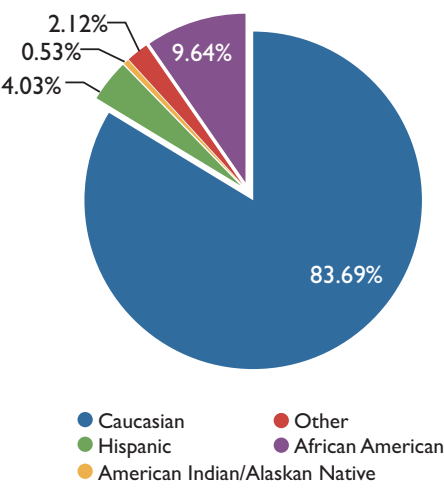
Ethnicity of Children on Clinical Studies
23 patients were enrolled in studies designed specifically for pediatric patients.



The Stages of Clinical Research Studies

Most clinical research involves the testing of a new drug. Each study progresses in an orderly series of steps, called phases. This allows researchers to ask and answer questions in a way that gives reliable results, while protecting patients. Clinical studies are usually classified in three phases:

- Phase I studies** are the first step in testing a new drug or intervention in humans. Researchers evaluate what dose is safe, how a new agent should be given, and how often.
- Phase II studies** continue to test the safety of the drug or intervention, and evaluate how well it works. Phase II studies usually focus on a particular type of cancer.
- Phase III studies** compare a new agent or intervention with the current standard. Phase III studies may include hundreds of people across the country.



Minorities on Clinical Research Studies

RPCI continues to benchmark the proportion of minorities on intervention studies. The total proportion of minority patients on intervention studies is approximately 15% for 2013. This was supported by a considerable number (n=81) of African American and Hispanic patients accrued into a cessation intervention study, directly addressing disparities in Western New York regarding the impact of tobacco. This is almost five points higher than minority accrual in 2012 (10%) and well above the incidence of cancer cases in minorities (9%) in Western New York counties.

Patient Protection

For the protection of participants, clinical studies at RPCI are subject to a rigorous review process by two panels:

Scientific Review Committee

This committee is made up of a multidisciplinary team of experts who review the study to make sure it is based on sound science.

Institutional Review Board (IRB)

This board makes sure the risks involved in the study are reasonable when compared to the possible benefits and closely monitors the study’s progress from beginning to end. Federal rules require that each IRB be made up of at least five people. One member must be from outside the institution running the study. IRBs are usually made up of a mix of medical specialists and non-medical members of the community.

ROBOT-ASSISTED SURGERY TRAINING PROGRAM

Applied Technology Laboratory For Advanced Surgery (ATLAS)

Established in 2007, the Applied Technology Laboratory for Advanced Surgery (ATLAS) Program at Roswell Park Cancer Institute (RPCI) began as a safety and quality assurance initiative and has grown into a global training center for robot-assisted surgery. Our dedicated staff have helped many novice surgical teams establish safe robot-assisted surgical programs at institutions around the globe. Our research program has designed and piloted several groundbreaking inventions, which include one of the first robotic simulators and initiatives in artificial intelligence, patient safety and operating room communications.

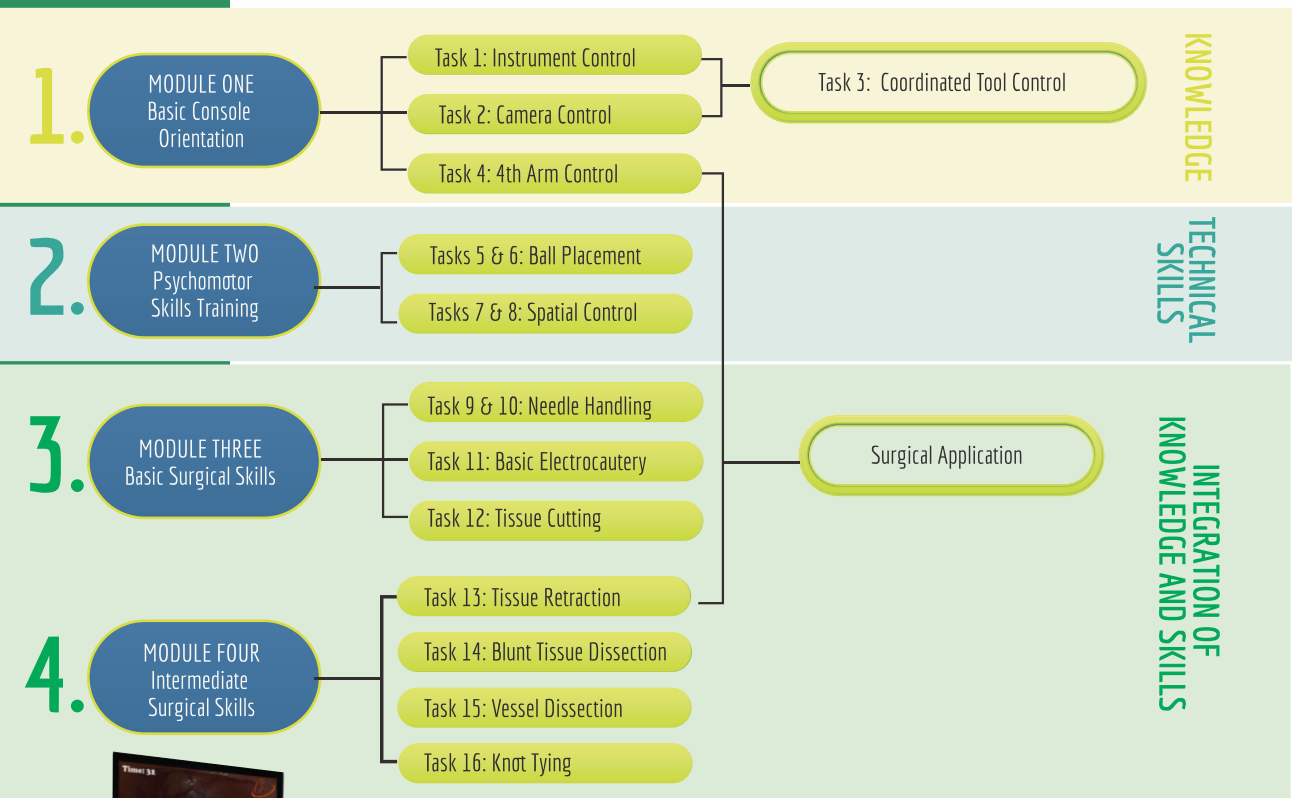
Training

More than 300 surgeons from 13 countries trained at ATLAS. Our surgical team has been invited to perform live surgical demonstrations at nine international conferences in six countries.

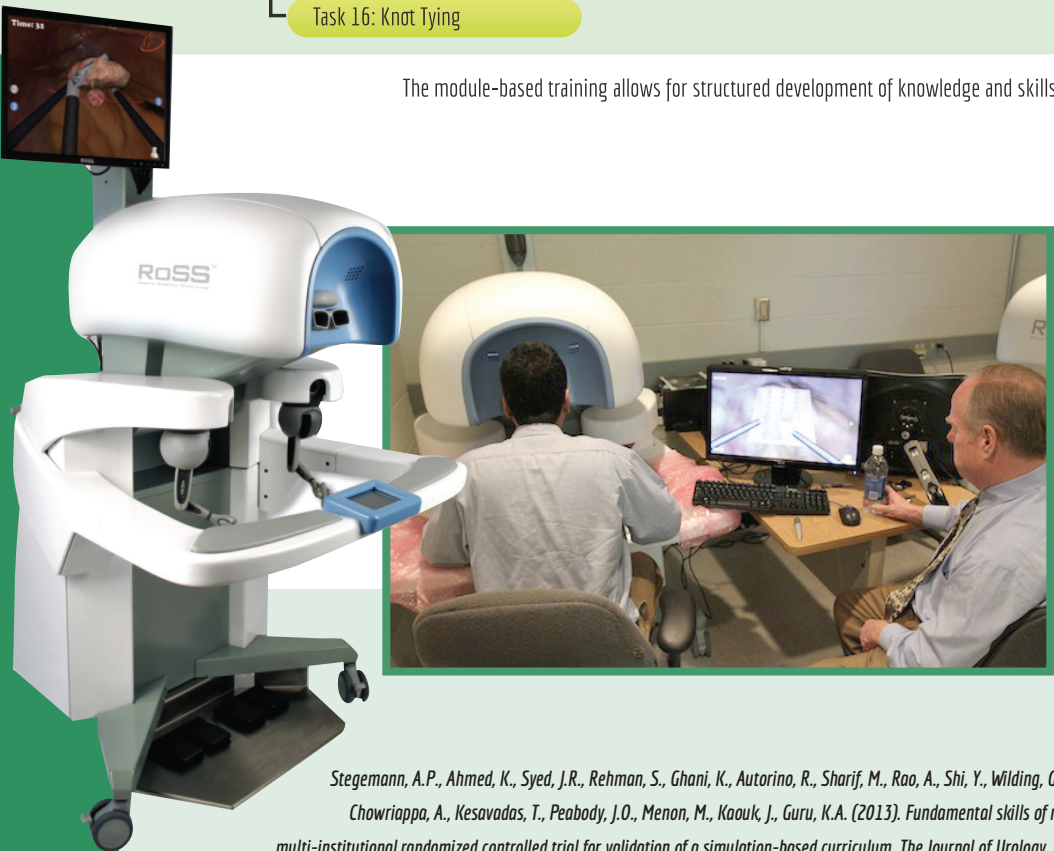
The Four Modules Employed in the ATLAS Training Program



Robotic Surgical Simulator (RoSS®)

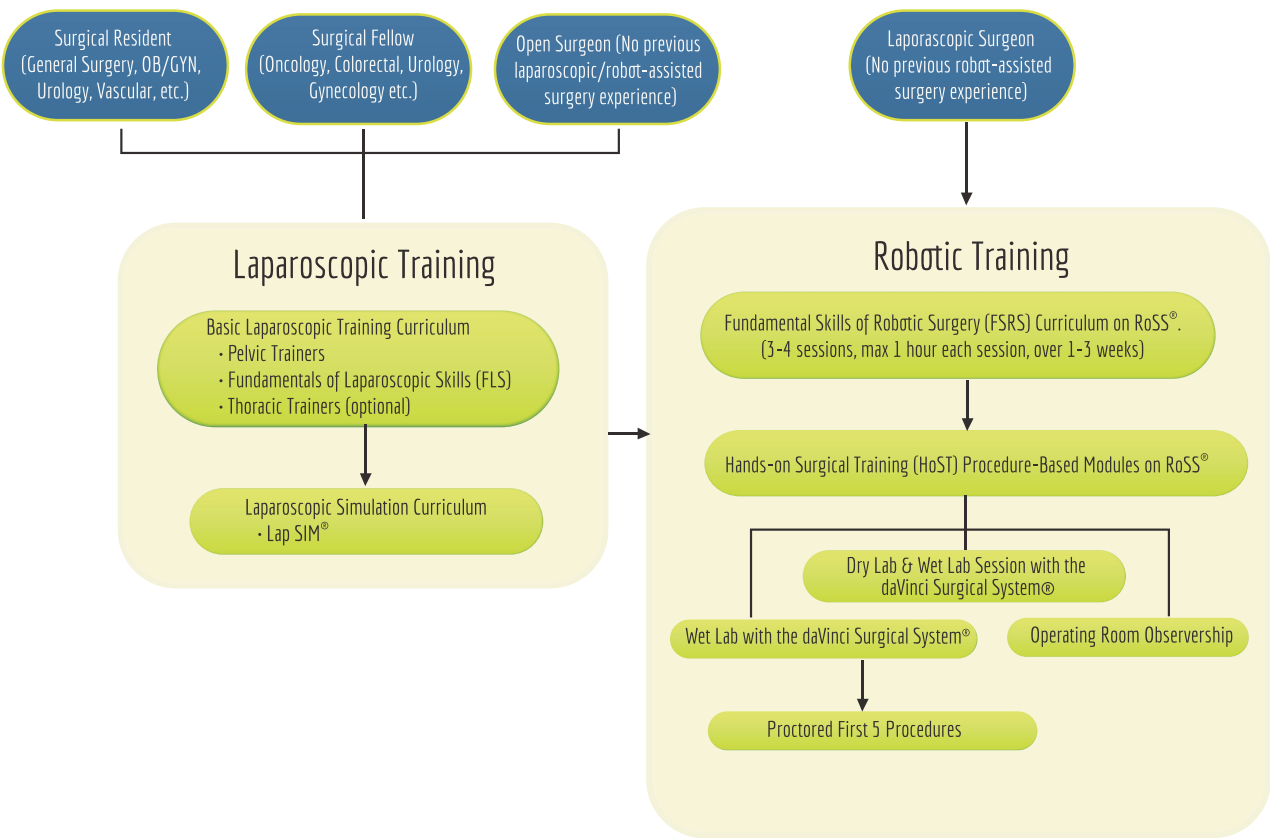


The module-based training allows for structured development of knowledge and skills.



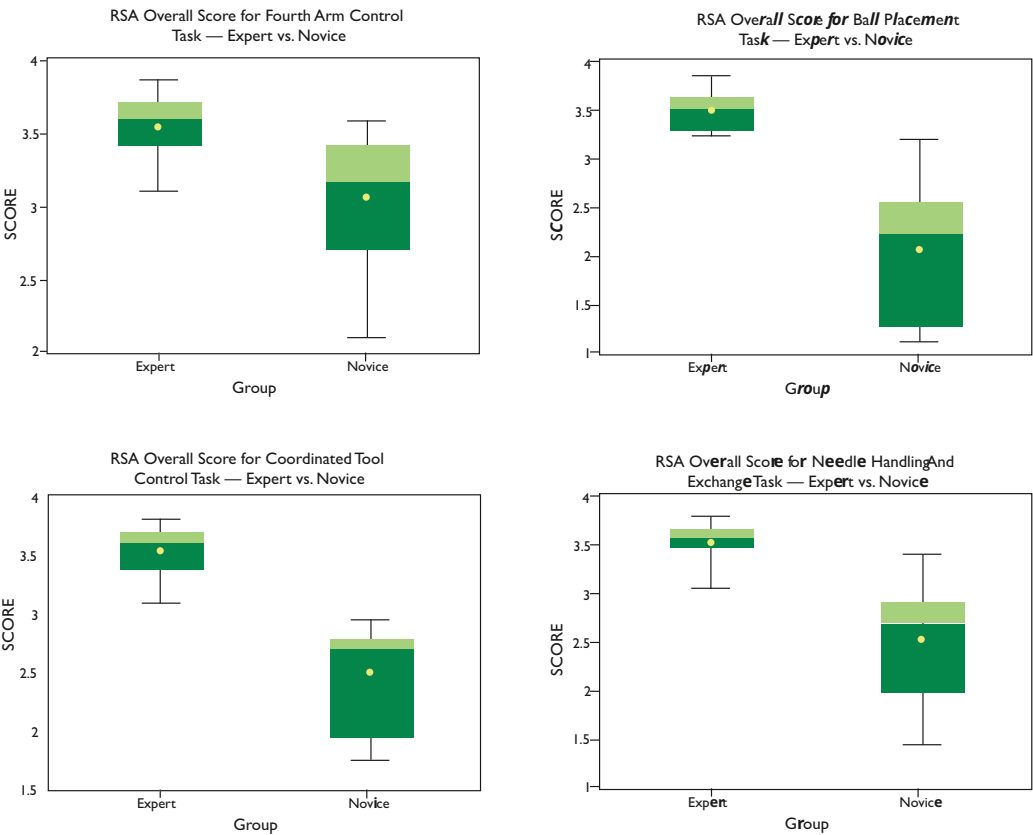
Reference:
Stegemann, A.P., Ahmed, K., Syed, J.R., Rehman, S., Ghani, K., Autorino, R., Sharif, M., Rao, A., Shi, Y., Wilding, G.E., Hassett, J.M., Chowriappa, A., Kesavadas, T., Peabody, J.O., Menon, M., Kaouk, J., Guru, K.A. (2013). Fundamental skills of robotic surgery: a multi-institutional randomized controlled trial for validation of a simulation-based curriculum. *The Journal of Urology*, 81 (4), 767-774.

Minimally Invasive Training Road Map



A survey of ATLAS-trained surgeons published in the *Canadian Journal of Urology* confirms the effectiveness of our unique curriculum: 64% of our Fundamental Skills of Robotic Surgery (FSRS)-certified surgeons were comfortable performing robot-assisted surgery (RAS) within five weeks after completion of training. ATLAS-trained teams scored an 8 on a Likert scale of 0-10 measuring their confidence in starting their RAS program.

Reference:
Attalla, K., Raza, S.J., Rehman, S., Stegemann, A., Field, E., Curtin, L., Sexton, S., Bienko, M., Bhandari, M., Guru, K.A. Effectiveness of a dedicated robot-assisted surgery training program. *The Canadian Journal of Urology*, 20(6), 7084-7090.

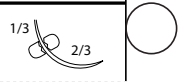



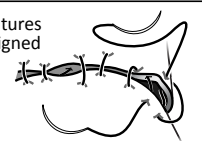


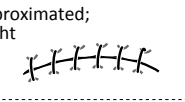
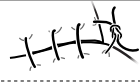
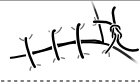



The proposed RSA score, which works like the MCAT score, demonstrated significantly better performance on all Fundamental Skills of Robotic Surgery (FSRS) Tasks.

The RSA score is a valid scoring system that could be incorporated into any virtual-reality-based surgical simulator to achieve standardized assessment of fundamental surgical skills required during robot-assisted surgery.

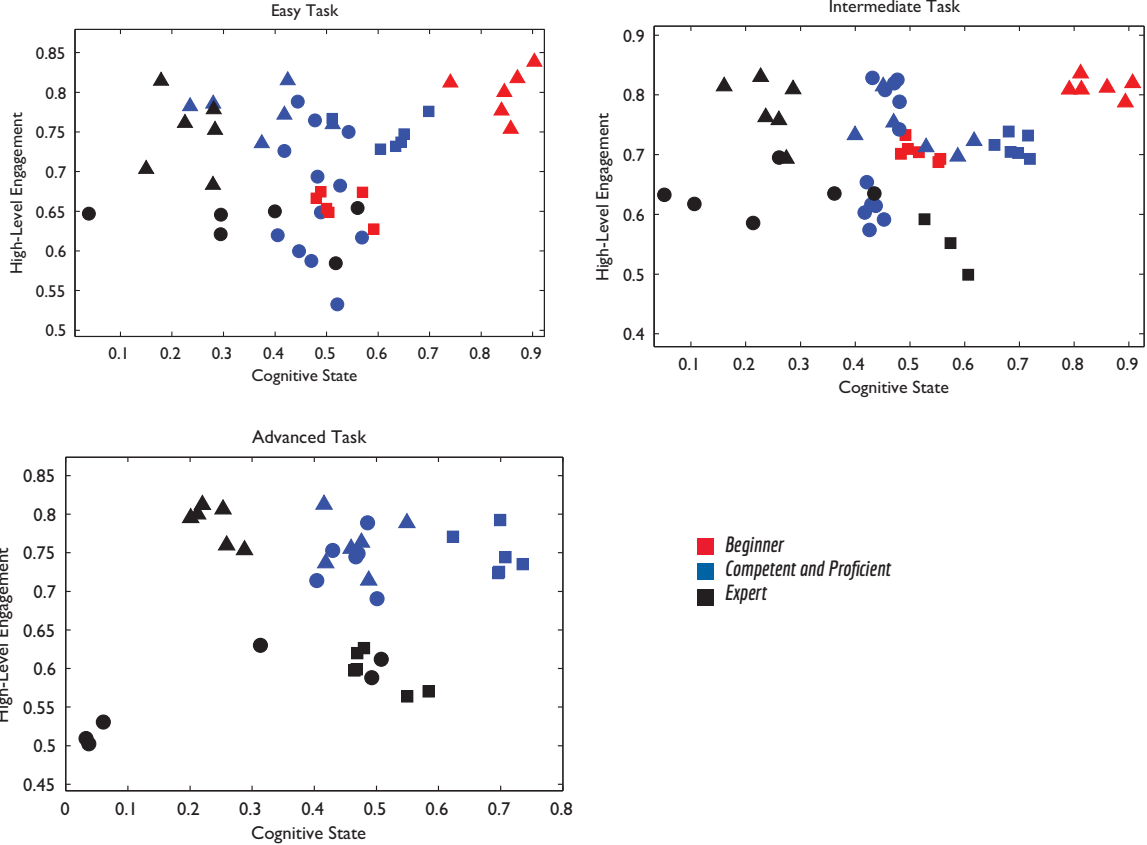
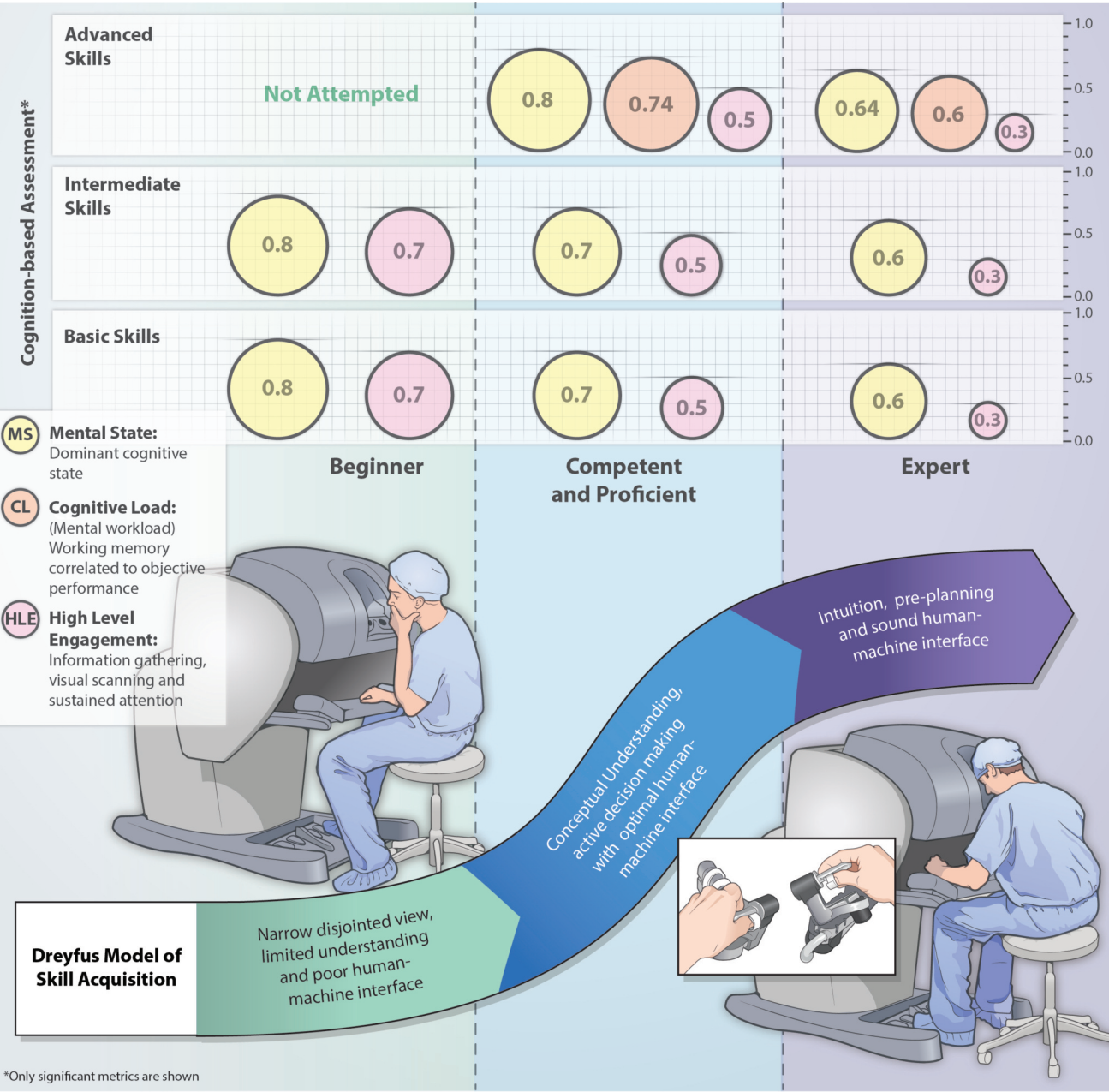
Reference:
Chowriappa, A.J., Shi, Y., Raza, S.J., Ahmed, K., Stegemann, A., Wilding, G., Kaouk, J., Peabody, J.O., Menon, M., Hassett, J.M., Kesavadas, T., Guru, K.A. Development and validation of a composite scoring system for robot-assisted surgical training—the robotic skills assessment score. *The Journal of Surgical Research*, 185(2), 561-569.

Innovations
Robotic-Anastomosis Competency Evaluation (RACE)

| RACE (Robotic Anastomosis Competency Evaluation) | | | | | |
|---|---|---|--|---|--|
| Domain | ① | ② | ③ | ④ | ⑤ |
| Needle positioning | ① Usually incorrect (>75%) | ② | ③ Incorrect less than half the time | ④ | ⑤ Always correct (>90%) perfect  |
| Needle entry | ① Needle tip usually (>75%) enters non-perpendicular | ② | ③ Needle tip enters half the time non-perpendicular | ④ | ⑤ Needle tip usually (>90%) enters perpendicular  |
| Needle driving & tissue trauma | ① Wrist rotation seen <25% of time with tissue trauma  | ② | ③ Wrist rotation seen <50% of time with minimal tissue trauma | ④ | ⑤ Wrist rotation almost always (>90%) seen with no tissue trauma  |
| Suture placement | ① > 6 sutures misaligned  | ② | ③ < 3 sutures misaligned | ④ | ⑤ All sutures well placed and aligned  |
| Tissue approximation | ① Poor approximation of posterior plate*  | ② | ③ 20% of circumference missing; unlikely watertight | ④ | ⑤ Well approximated; watertight  |
| Knot tying | ① Suture broken*  | ② | ③ Air knot  | ④ | ⑤ Perfect secure knot  |
| * Denotes a critical error; requires supervisor to take over | | | | | |
| Applied Technology Laboratory for Advanced Surgery (ATLAS) Program, Roswell Park Cancer Institute, Buffalo, NY © 2013 | | | | | |

Two rounds of Delphi Methodology achieved consensus on language and content of the Robotic-Anastomosis Competency Evaluation (RACE). Eight expert, 10 advanced beginner, and 10 novice, in robot-assisted surgery participated in the validation study. The overall score for the expert group (27.3) was higher than the advanced beginner (19.5, p=0.04) and novice groups (13.6, p=0.001). The advanced beginner and novice groups differed in overall scores (p=0.03). RACE allows evaluation of surgical competence to perform urethro-vesical anastomosis for robot-assisted radical prostatectomy, when using an inanimate model.

Reference:
Raza, S.J., Field, E., Jay, C., Eun, D., Fumo, M., Hu, J.C., Lee, D., Mehbob, Z., Nyquist, J., Peabody, J.O., Sarle, R., Stricker, H., Zhengyu, Y., Wilding, G., Mohler, J.L., Guru, K.A. (2014). Surgical Competency for Urethro-vesical Anastomosis during Robot-assisted Radical Prostatectomy: Development and Validation of the Robotic Anastomosis Competency Evaluation. *Urology* (article in press).



Utilizing cognitive metrics, significant differences were noted between all groups for the basic and intermediate skills. In advanced skills, while no significant differences were noted except for time (599.6 seconds vs. 1116 seconds) between CPG and the EG using tool-based metrics, the cognitive metrics revealed significant differences between both groups.

Reference:
 Guru, K.A., Esfahani, E.T., Raza, S.J., Bhat, R., Wang, K., Hammond, Y., Wilding, G., Peabody, J.O., Chowriappa, A.J. (2014) Cognitive Skills Assessment During Robot-Assisted Surgery: Separating Wheat from Chaff. The British Journal of Urology International.

PATIENT EXPERIENCE

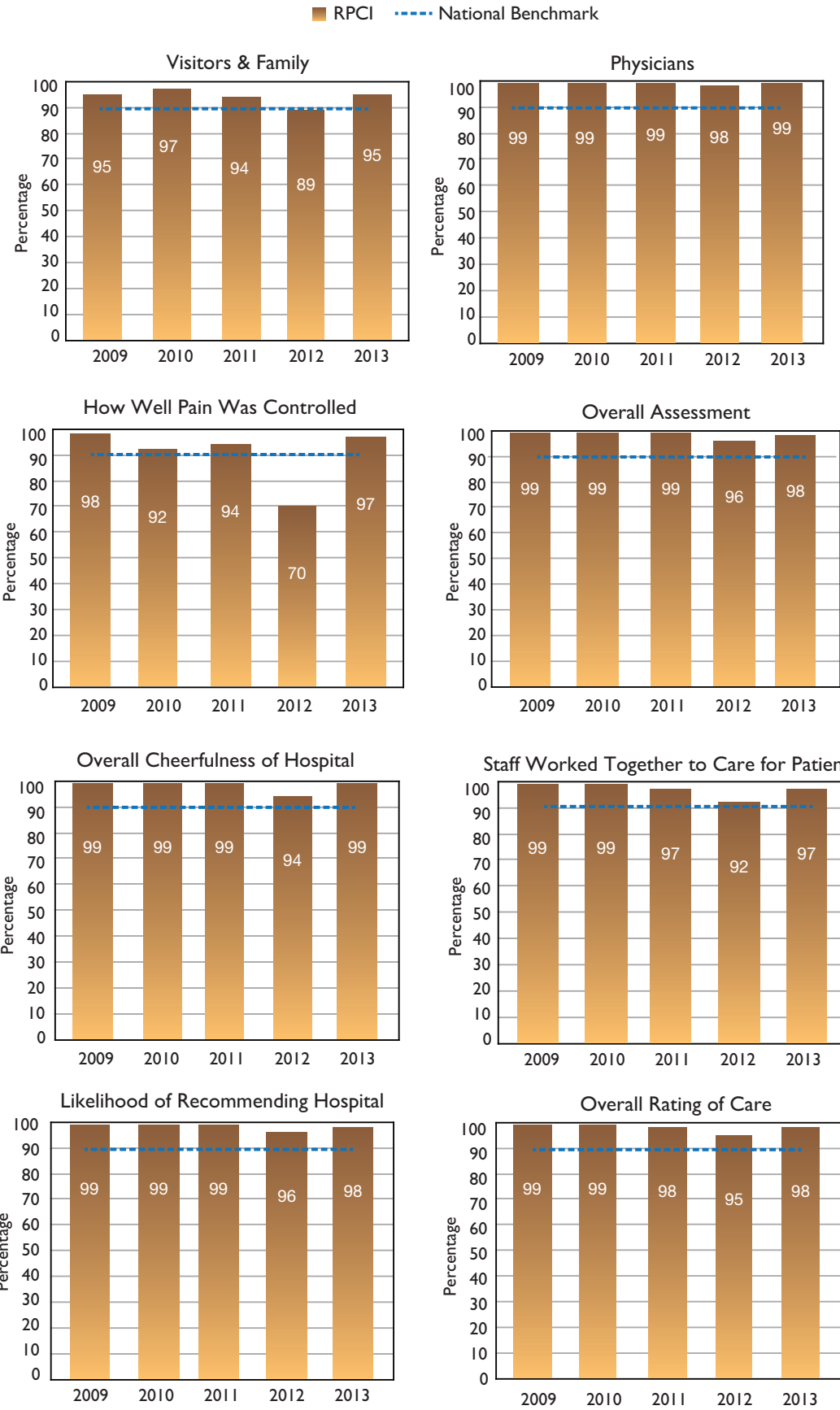
Press Ganey

Used by over one-third of U.S. Hospitals, **Press Ganey** maintains a national database for benchmarking purposes, for patient-satisfaction measurement and improvement services. RPCI has been using Press Ganey for patient satisfaction benchmarking since 2002, and RPCI's most recent **Overall Patient Satisfaction Score** placed it in the **97th percentile nationwide**.

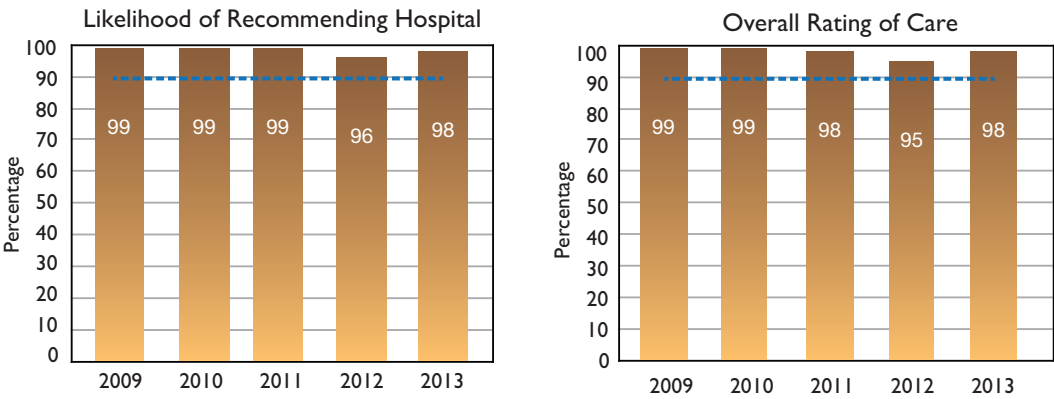
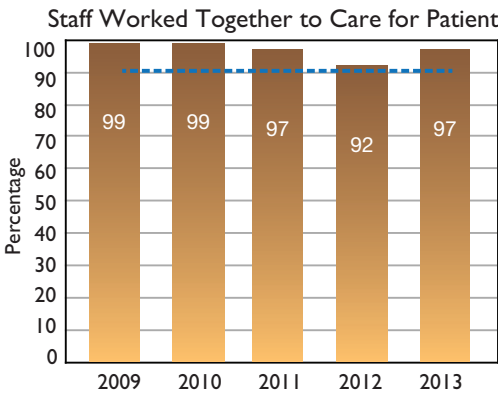
The goal of RPCI, as a comprehensive cancer treatment center, is to ensure that we put our patients and families first. Roswell Park measures the quality of the care our patients receive not only through our clinical outcomes, but also the emotional and physical journey they experience. We value our patients' feedback and ask them to take an active role in the care they receive.

Roswell Park consistently works toward the patient-centered care model through multidisciplinary care, interdisciplinary collaboration, and the implementation of patient advisory committees. In addition to providing high-quality care, Roswell Park aims to support the whole patient. Patients' cultures, personal preferences, goals and quality of life are part of their treatment plan and also in alignment with their own treatment goals. We strive to treat the whole patient through diagnosis and treatment to recovery.

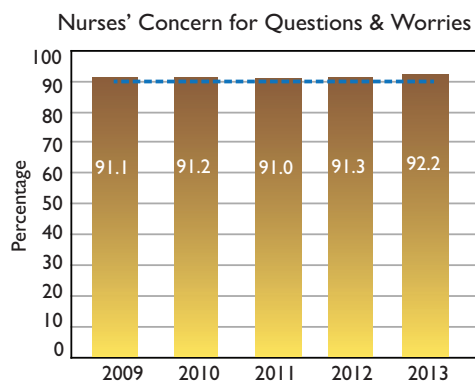
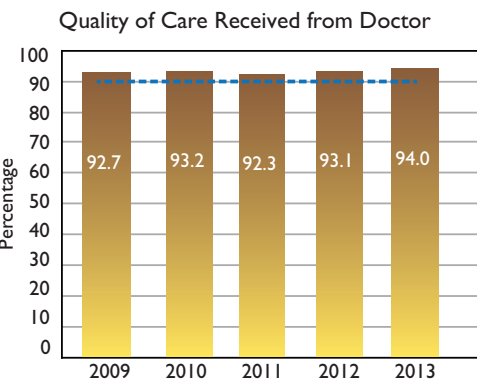
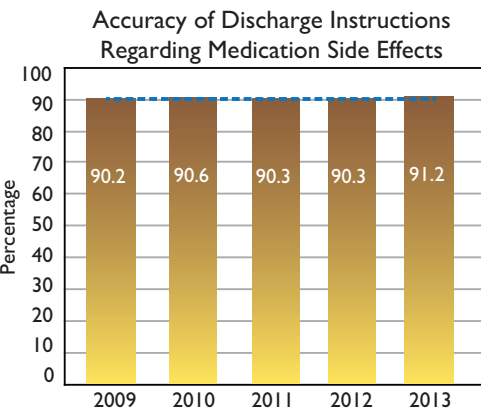
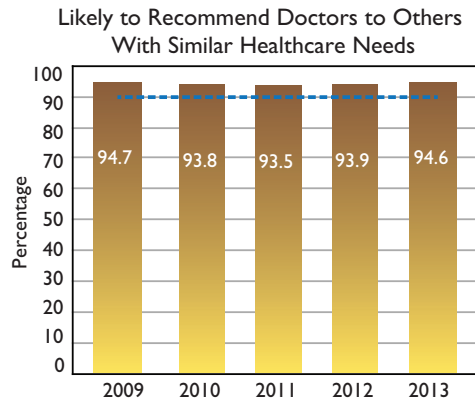
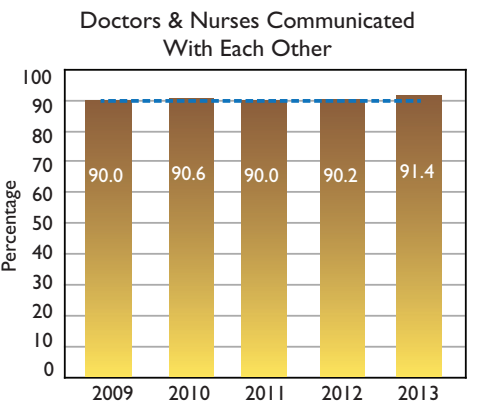
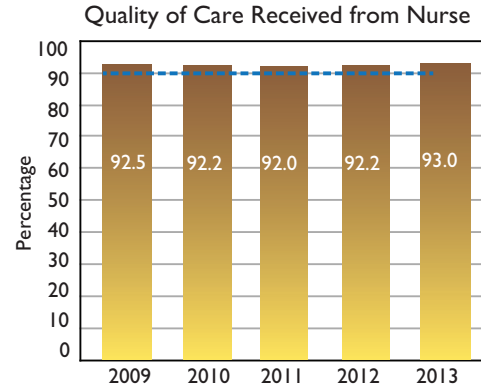
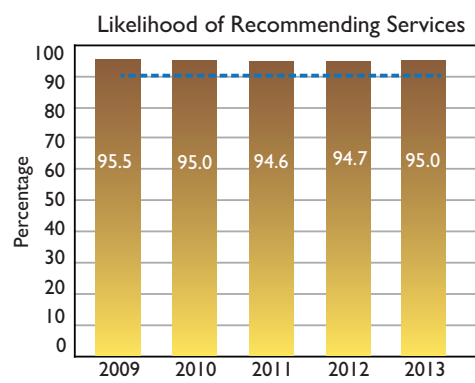
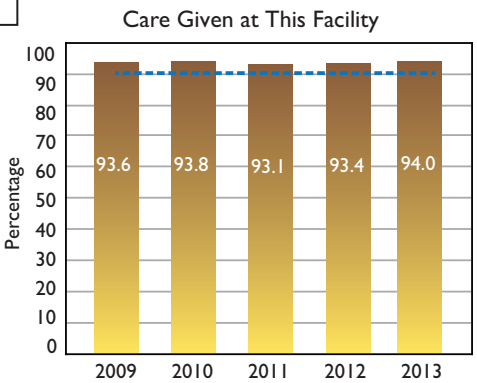
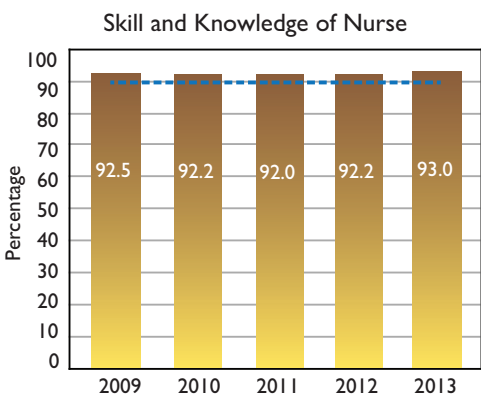
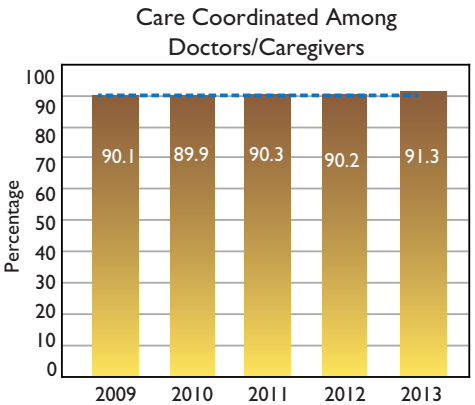
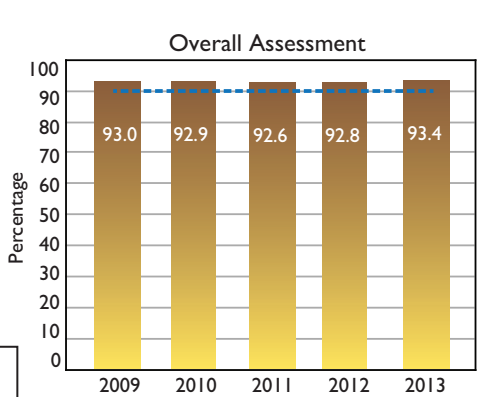
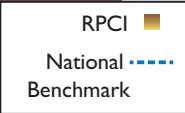
Press Ganey
Inpatient



Press Ganey
Inpatient



Press Ganey
Outpatient



The Resource Center for Patients and Families

The Resource Center for Patients and Families offers information and support for all visitors to Roswell Park Cancer Institute. It provides patient education materials from Roswell Park clinicians as well as national cancer patient organizations; access to WiFi, computers and printers; a lending library of books, DVDs and CDs; and a complimentary wig program for any cancer patient in the community.

From January 1 – March 31, 2014, the center distributed 234 wigs to cancer patients being treated at Roswell Park Cancer Institute as well as other facilities in New York State. An average of 25 patients and families visit The Resource Center each day, Monday through Friday.

Patient Experience / Patient Advocacy Department

The Office of Patient Experience is dedicated to working with all areas of Roswell Park to enhance the RPCI experience for patients and families. This department, which consists of Patient Advocacy and Patient Navigation, is critical, as it partnered with RPCI departments to create ongoing patient-centered care and experiences.

As part of the Department of Patient Experience, patient advocates serve as liaisons between healthcare services and patients and families. Patient advocates assist patients and families to resolve issues with respect to coordination of care, mediate communication, improve overall quality of service, and refer patients and families to needed services and resources. Patient advocates represent patient and family interests on the Institutional Review Board, Ethics Committee; Quality Improvement Committee; Quality of Life Committee; and Workplace and Patient Safety Committee.

PATIENT SAFETY AND QUALITY

RPCI is committed to promoting a strong safety culture that reduces errors and improves patient outcomes. Our leaders are working to implement protective structures to assure accountability for integrity in quality and safety evaluation and comprehensive, transparent, accurate data collection and reporting to internal and external oversight bodies.

Patient Safety Committee (PSC)

At RPCI, the Patient Safety Steering Committee serves as the coordinating point and information-sharing forum for patient safety issues and is comprised of a multidisciplinary team of administrators and clinicians.

The responsibilities of the PSC include:

- Promotion of a culture of safety that encourages and facilitates event reporting, communication and teamwork
- Oversight of root cause analysis process
- Coordination of patient safety activities, including recommendations for performance improvement opportunities and process change
- Ensures that the Institute has knowledge of current patient safety literature and recommendations

Monitoring Patient Outcomes

National Surgical Quality Improvement Project

The National Surgical Quality Improvement Project (NSQIP) is a quality improvement program developed and supported by the American College of Surgeons specifically to decrease patient complications after surgery and improve outcomes for surgical patients overall. The program is nationally validated, generating risk-adjusted data as an outcomes-based program to measure and improve the quality of surgical care. The program not only benefits patients, but benefits hospitals through reduction in hospital stays and costs related to postoperative complications. Surgeons benefit through the availability of risk-adjusted data for targeted evidence-based decision-making to set reasonable patient expectations.

UHC (University Health System Consortium)

Roswell Park has recently become a member of the University Health System Consortium, or UHC. UHC is an alliance of 120+ academic medical centers and almost 300 of their affiliated hospitals, representing the nation's leading academic medical centers. The collaboration through UHC with other academic medical centers, and particularly with the major national comprehensive cancer centers, will permit us to perform analyses of clinical, operational and financial performance.

Projects to Improve Patient Safety and Quality

NSQIP-Driven Organizational Improvement Projects at RPCI:

Pneumonia Prevention Team: The multidisciplinary Pneumonia Prevention Team has identified and implemented projects to prevent pneumonia through the continuum of care at RPCI. The data continue to show improvement as a result of this work.

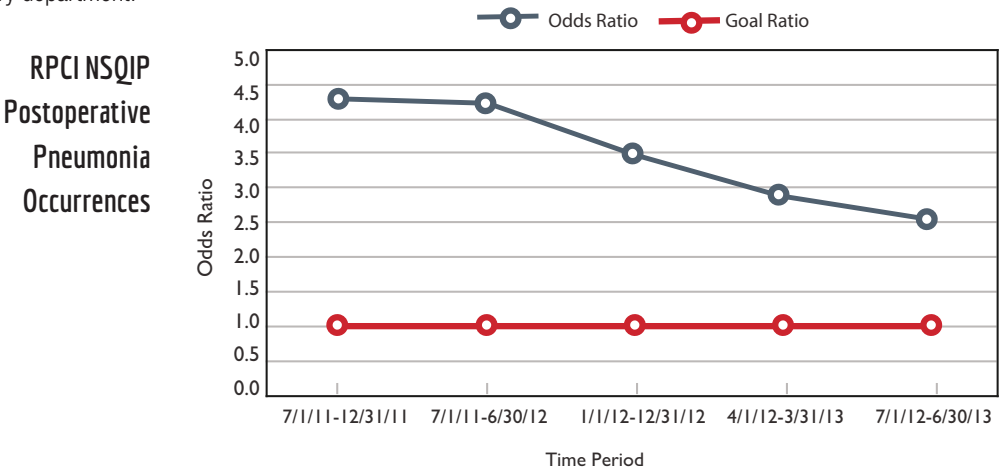
Specific pneumonia-prevention projects implemented include:

- **Preoperative** – Nurses teach patients in the preoperative clinic setting about the use of spirometers; pulmonary consults are ordered, as needed; assessment is made for swallowing difficulties, which causes aspiration pneumonia.
- **Intraoperatively** – Adjustment in the use of certain anesthesia medications by the anesthesiologists.
- **Postoperatively** – Nurses collaborate in assuring the postoperative ambulation of patients with specific discharge instructions, to prevent pneumonia in the home for the first 30 days after discharge. The Speech Department professionals developed a comprehensive approach to assessing patients for aspiration risk.

Preoperative Assessment of the Geriatric Patient

A second multidisciplinary team, the Preoperative Assessment of the Geriatric Patient, is in the process of developing strategies to improve postoperative outcomes for patients older than 65 years. The NSQIP program offers best-practice guidelines that have been helpful in giving the team direction. The most recent semi-annual data from NSQIP shows improvement in this area in that RPCI is no longer considered a high outlier.

Other projects, such as surgical site infection reduction, are driven within departments and are steadily showing improvement in almost every department.



Catheter-Associated Urinary Tract Infection (CAUTI)

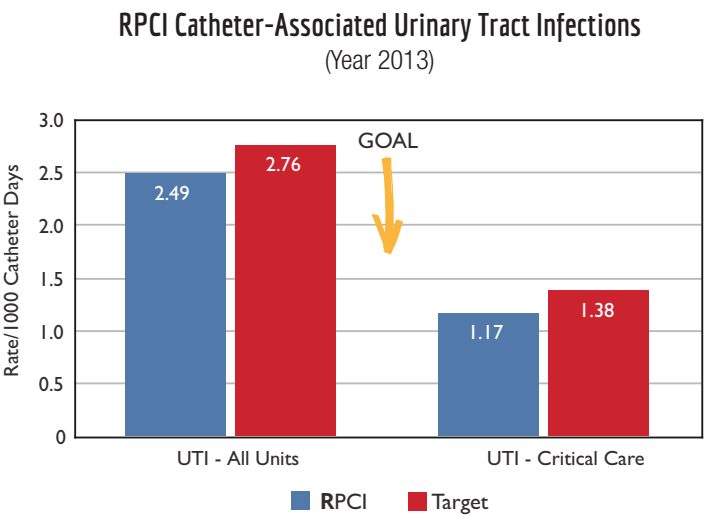
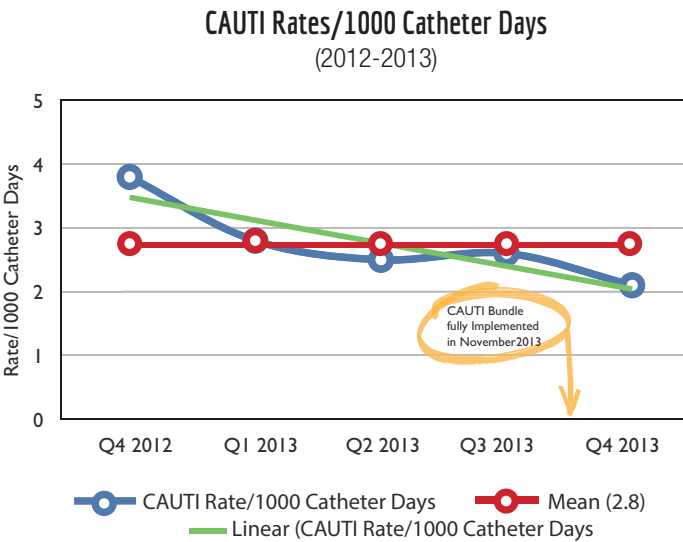
In April 2013 a program was introduced to reduce urinary catheter use, decrease rates of catheter-associated urinary tract infections (CAUTI), and improve patient safety. Built on evidence-based practices, the plan of action is called the CAUTI bundle.

Infection Prevention nurses created and led the multidisciplinary group that developed the plan. Members included physicians; nurses; Urology staff; nurses from Information Technology, Nursing Quality, Nursing Education, and Nursing Administration; Wound, Ostomy, Continence nurses; Magnet coordinators; Perioperative staff; Cystoscopy staff; a physician from the Department of Medicine; Purchasing and Receiving staff; and representatives of medical equipment vendors.

The bundle included:

- Development of a prompt in the Electronic Medical Record to alert physicians to the presence of Foley catheters and to determine and document the need.
- Redesign of nursing flow sheets to capture accurate data on catheter use.
- Creation and implementation, with staff input, of an algorithm to determine what a nurse should do after a urinary catheter is discontinued.
- Team review of any identified CAUTI cases.
- Standardization of catheter brand.
- Introduction of updated policies.
- An educational blitz to ensure that nurses were educated about the CAUTI bundle, including the algorithm and bladder scanner use.
- Launching of a website for CAUTI prevention, with links to pages about all aspects of the CAUTI bundle.
- Purchase of bladder scanners.
- Changes to catheter inventory on all units.

| Quarters | CAUTI Rate/1000 Catheter Days | Mean (2.8) |
|----------|-------------------------------|------------|
| Q4 2012 | 3.8 | 2.8 |
| Q1 2013 | 2.8 | 2.8 |
| Q2 2013 | 2.5 | 2.8 |
| Q3 2013 | 2.6 | 2.8 |
| Q4 2013 | 2.1 | 2.8 |
| Mean | 2.8 | |



Central Line-Associated Blood Stream Infection (CLABSI)

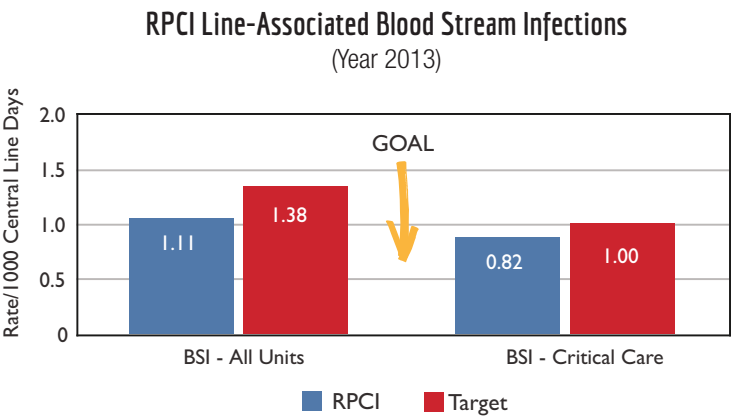
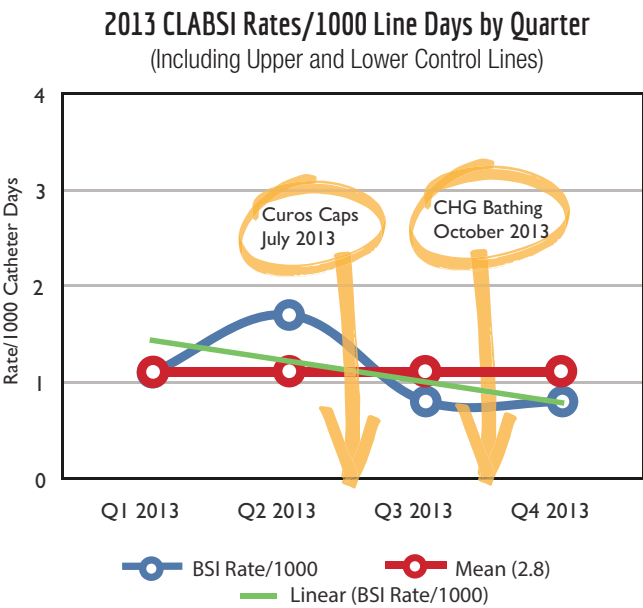
Healthcare-associated infection is a leading cause of preventable illness and death and is often a result of colonizing bacteria that overcome body defenses. Our patients are at higher risk for infections as a result of the treatments for cancer. Below are some interventions that were undertaken to reduce the incidence of CLABSI at RPCI.

CUROS Caps

CUROS caps are alcohol-impregnated caps that are placed on all IV access points. The purpose of the caps is to decrease central line infection rates by providing protection and cleansing of the caps at all times. CLABSI can be detrimental to patients, requiring a lengthy hospital stay with poor outcomes. CUROS caps are one step in a multidisciplinary process to prevent CLABSI. Our goal was to increase compliance with the usage of CUROS caps among all the inpatient units to decrease CLABSI. We have been successful in this endeavor.

CHG Bathing Cloths

Several of the inpatient units are using bathing cloths that are impregnated with chlorhexidine (CHG) to prevent infection. Research shows that patients in bone marrow transplantation and intensive care units had reduced rates of infection when using this product. This, along with the use of CUROS caps, is intended to decrease the incidence of CLABSI in our oncology population.



Masimo/Patient Safety Net:

Patient Safety Net is a remote monitoring and clinician notification system. The system was purchased and implemented on four surgical floors in October 2013.

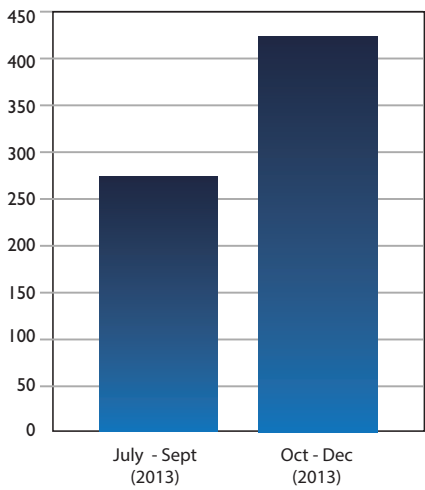
The system provides for continuous pulse oximetry and pulse rate monitoring of select patients. It includes pager notification to nursing staff to warn of potentially critical patient events. The premise of the system is that early intervention equates to improved patient outcomes.

Patient Safety Net was purchased for four nursing units to provide continuous monitoring to a larger number of patients. The intent is to improve recognition and response to changes in a patient's condition that could lead to patient deterioration. Appropriate patients are placed on Patient Safety Net Monitor, and the nurse carries a pager with an alarm that will sound when decreasing oxygenation or critical pulse level is noted.

Since implementation in October, the Institute has been able to provide more patients with continuous pulse oximetry and monitoring.



Number of Patients with Continuous Pulse Oximetry on 6 East, 6 West, 7 East and 7 West



NURSING

Nursing Excellence

The Department of Nursing promotes an environment in which each patient's human dignity and human rights are recognized and respected. The nursing philosophy at RPCI recognizes that basic research correlated with clinical research is essential to the fundamental understanding of the nature, etiology and management of all cancers and allied diseases. As an integral part of Roswell Park Cancer Institute, nursing collaborates with various disciplines on research protocols and conducts nursing research intradisciplinarily to optimize the delivery of high-quality oncology care and continuously expand the knowledge base of oncology nursing science.

A Quest for Professional Growth

Nursing at RPCI promotes an environment that supports the development of the expertise of its staff relative to cancer management and facilitates its communication with patients, families, and the public. Nursing communicates its standards of care by sharing advances with the nursing community through a variety of professional venues.

Worldwide Recognition

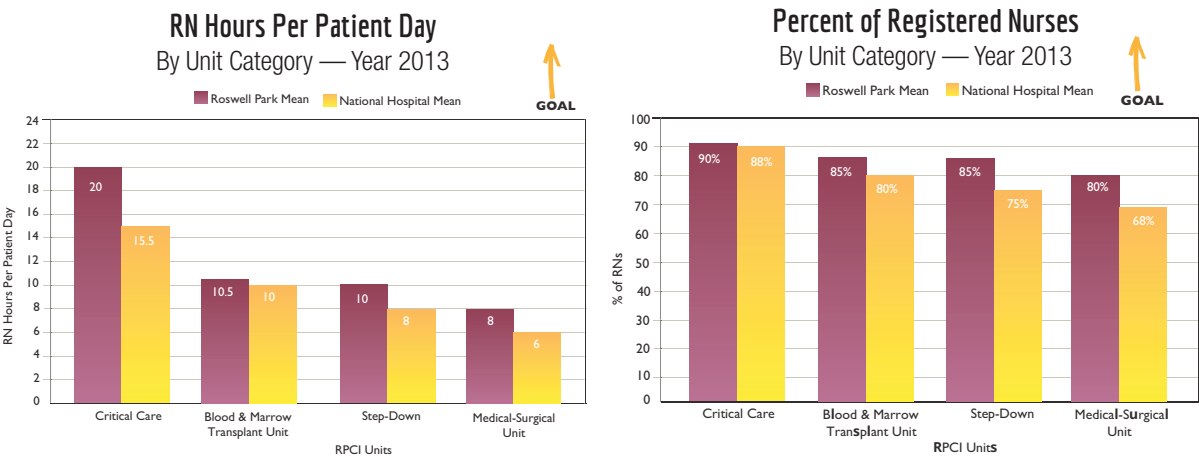
In 2010 Roswell Park Cancer Institute achieved Magnet Recognition for nursing excellence. This is a top honor that is shared with only 7% of the hospitals in the world. The Magnet website notes, “Magnet Recognition is an organizational credential awarded to exceptional healthcare organizations that meet ANCC standards for quality patient care, nursing excellence, and innovations in professional nursing practice.” Magnet designation is the ultimate distinction for high quality nursing and a leading source of nursing best practices worldwide. According to the American Nurses Credentialing Center, a Magnet Hospital can expect increased patient satisfaction, decreased mortality rates, decreased pressure ulcers, decreased falls and improved patient safety and quality. RPCI is the only hospital in Western New York with Magnet Recognition and the only free-standing cancer center in New York State with this honor.

Benefits of Magnet recognition:

- o Ability to attract and retain top talent in nursing
- o Improved patient care, safety and satisfaction
- o Fosters a collaborative culture
- o Advances nursing standards and practice

Nursing Care at RPCI

Hospital nurse staffing is a matter of major concern because of the effects it can have on patient safety and quality of care. A broad array of research on this topic has found an association between lower nurse staffing levels and higher rates of some adverse patient outcomes. A new evidence report produced by an AHRQ-funded Evidence-based Practice Center (EPC) reviewed 26 studies on the relationship between nurse staffing levels and measures of patient safety. Most of the studies examined nurse staffing levels and adverse occurrences in the hospital setting. The EPC's researchers found that lower nurse-to-patient ratios were associated with higher rates of nonfatal adverse outcomes. This was true at both the hospital level and the nursing unit level.



RN hours per patient day refers to the number of hours of nursing care provided by an RN on a hospital unit, compared to the number of patients on that unit during a 24-hour period. Research has demonstrated that higher nursing-care hours can have a positive impact on patient safety and quality of care. In 2013 RPCI demonstrated a higher number of hours of nursing care provided directly by an RN when compared to the national hospital mean.

Skill mix refers to the classification mix of the workforce on the nursing units. At RPCI the workforce includes RNs (Registered Nurses) and HCAs (Hospital Clinical Assistants). The overall average is 80-85% RNs and 15-20% HCAs. In 2013 RPCI was able to show that it provided higher numbers of RNs per unit category when compared to the national hospital mean.

Nursing Education

With 35% of Roswell Park’s nurses holding professional certification, RPCI further demonstrates that our nurses are highly skilled, knowledgeable and experienced in their field.

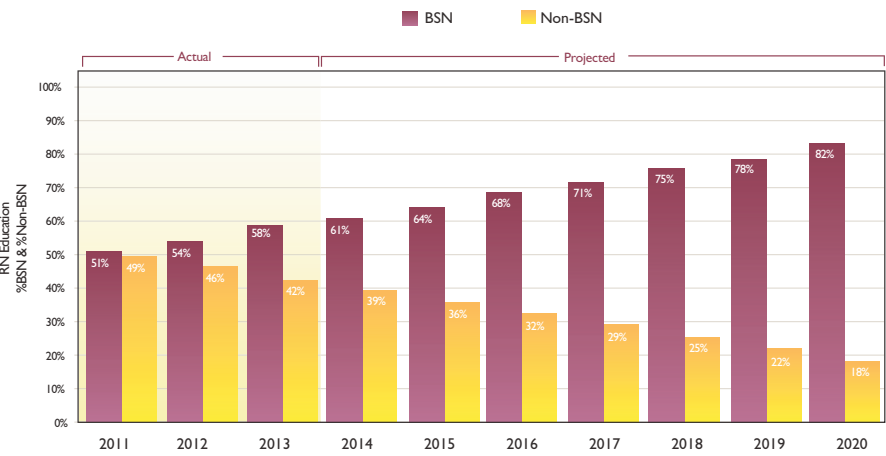
Certifications held at RPCI:

- Certified Oncology Nurse
- Certified Pediatric Hematology Oncology Nurse
- Certified Nurse in the Operating Room
- Certified Gastroenterology Nurse
- Certified Clinical Research Professional
- Certified Nurse Practitioner
- Certified Clinical Research Coordinator
- Certified Case Manager
- Certified Professional in Healthcare Quality
- Certified Med-Surgical Nurse
- Certified Hematopoietic Transplant Coordinator
- Certified Dialysis Nurse
- Certified Wound Ostomy Continence Nurse
- Certified Critical Care Nurse
- Certified Infection Control
- Certified Professional Healthcare Quality

Benefits of professional nursing certification

- For patients:** Certification provides patients and their families with validation that the nurse caring for them has demonstrated experience, knowledge and skills in the complex specialty of critical care.
(<http://www.aacn.org/wd/certifications/content/benefitstopnrs.pcms?menu=certification>)
- Benefit for employers:** Nurse certification and the continuing education required to maintain certification contribute to the creation of an environment of professionalism and a culture of retention. Certification is also a vehicle for hospitals to differentiate themselves from competitors and demonstrate to consumers that they have attracted the most skilled and experienced nursing professionals *(<http://www.aacn.org/wd/certifications/content/benefitstopnrs.pcms?menu=certification>)*
- Benefit for nurses:** By becoming certified, nurses validate their expert knowledge and skills and therefore position themselves for appropriate recognition and a critical sense of confidence and achievement

RPCI Progress Toward 80% BSN by 2020
(Based on Annual BSN Increase of 5%)



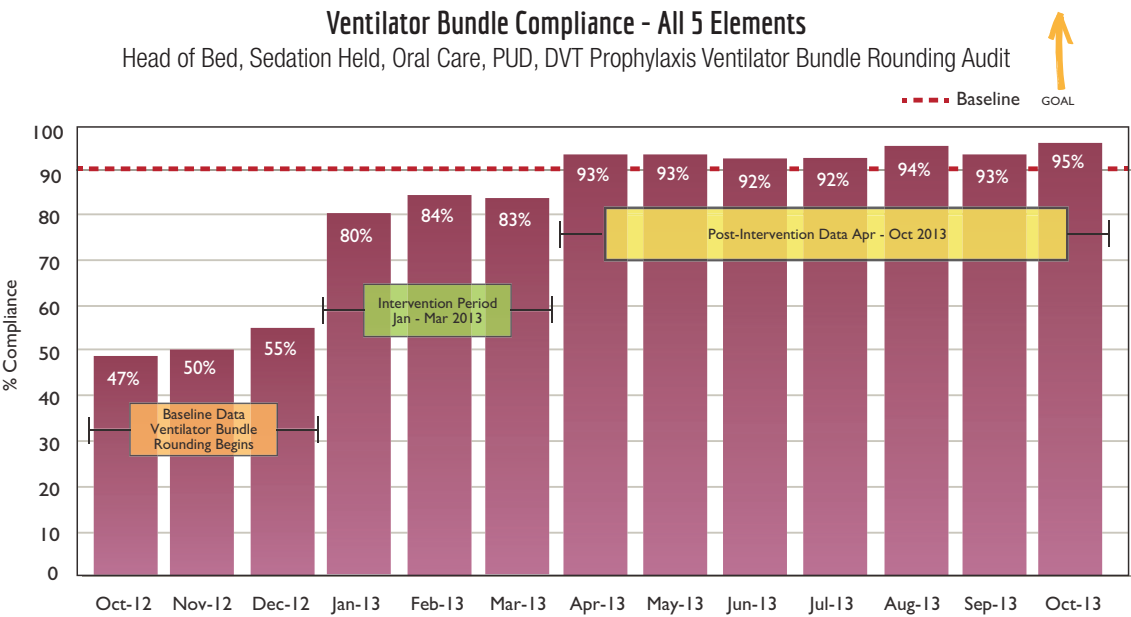
Healthcare is a changing environment, with special attention paid to the impact of higher education for nurses, chiefly bachelor’s-prepared nurses. Current research has shown that BSN-prepared nurses are associated with improved patient outcomes. According to The Institute of Medicine (2010), “The Future of Nursing, Leading Change, Advancing Health,” one of four key goals is to increase the proportion of baccalaureate-degree nurses to 80% by 2020. With our original goals reached and surpassed, RPCI will continue to search for and implement methods to support our nurses in pursuing higher education.

Nursing Quality Indicators

Measuring adverse patient outcomes gives us an indication of the quality of care delivered. Some adverse patient outcomes potentially sensitive to nursing care are Catheter-Associated Urinary Tract Infections (CAUTI), Central Line-Associated Bloodstream Infections (CLABSI), pneumonia, pressure ulcers, extravasation and falls prevention. Most research has focused on adverse rather than positive patient outcomes for the simple reason that adverse outcomes are much more likely to be documented in the medical record.

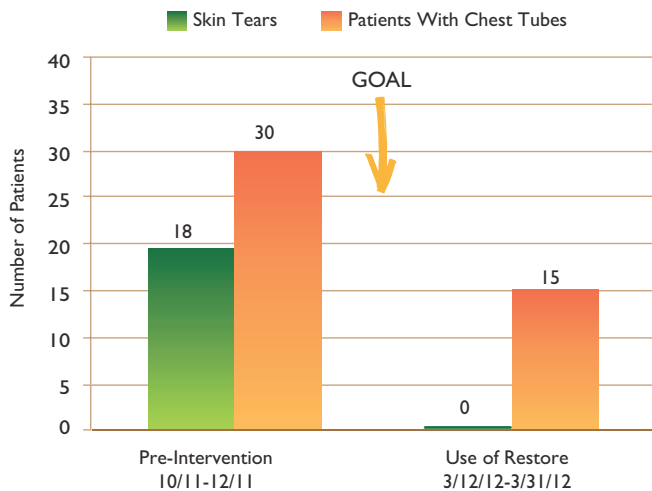
ICU Patients with Ventilator-Associated Pneumonia (VAP)

The Partnership for Patients initiative has brought significant change to the ventilator bundle for critical care. We increased awareness of the ventilator bundle through education to staff as well as audits for compliance. With teamwork from all ICU staff, ventilator bundles were updated to include current best practices. With the goal of a 50% decrease in ventilator-associated pneumonia (VAP), the final outcome was an absolute reduction in ventilator-associated pneumonia to 0% of ICU patients with VAP.



Restore Project

Observing a patient need, a clinical nurse devised a plan to eliminate skin tears resulting from postoperative dressings removal. The hypothesis was that using Restore™/hydrocolloid dressings would protect the skin from the adhesive and provide a surface to place the tape for chest tube patients. After the adaptation of placing Restore™ on postop patients with chest tubes, there was no evidence of skin tears with initial and subsequent dressing changes. The outcome is more-satisfied and comfortable patients with better postoperative outcomes.

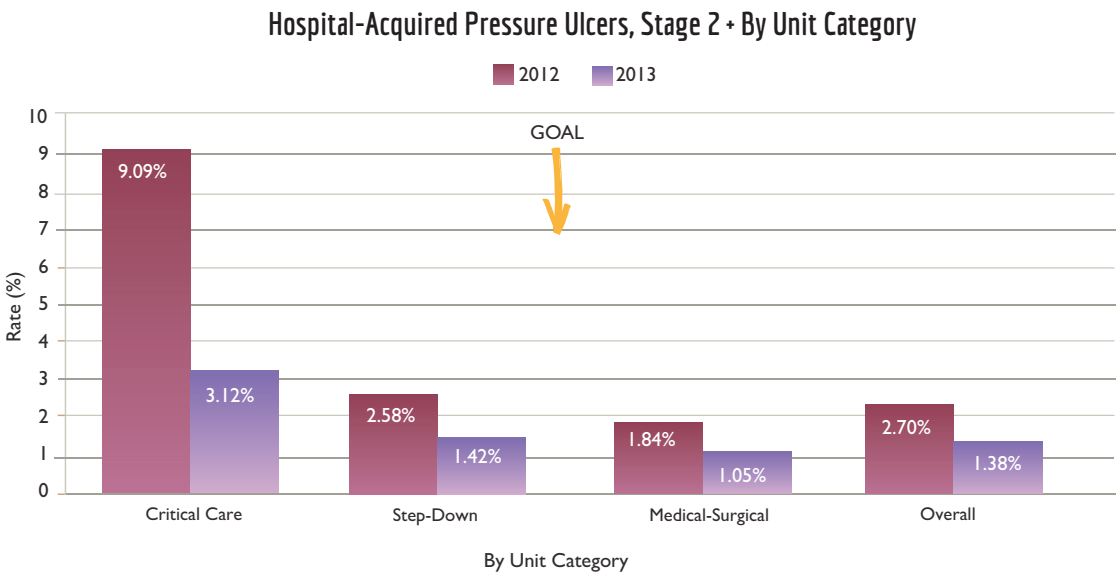
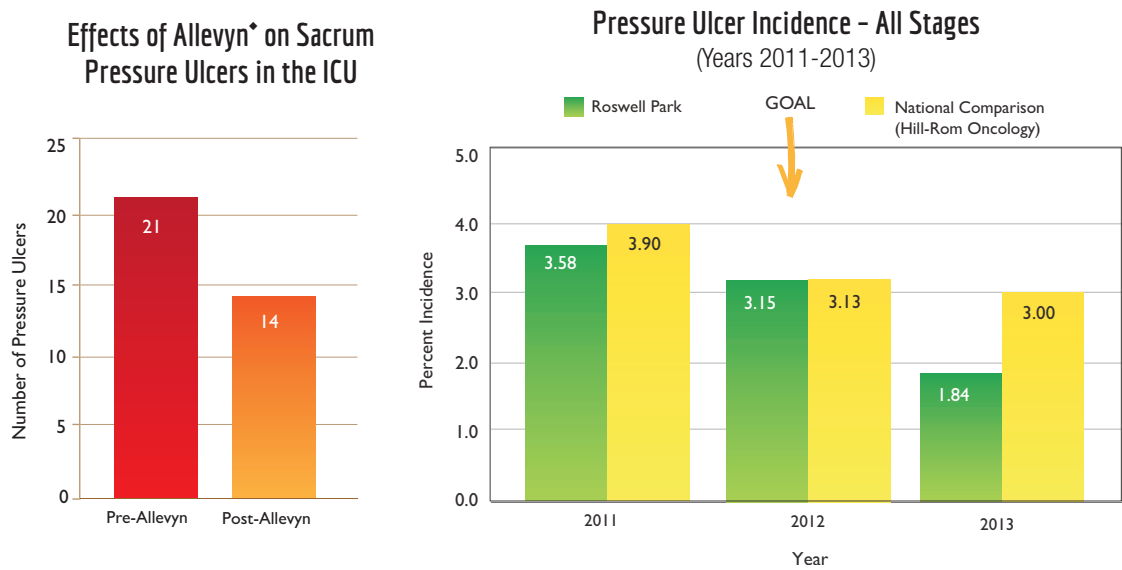


Pressure Ulcer Prevention

With potential complications that can arise from some treatment regimens, providing care to the oncology population would not be complete without the expertise of our Certified Wound, Ostomy, and Continence Nurses (CWOCN). Not only are they experts in pressure ulcer prevention and treatment, they also specialize in ostomy care and teaching, wound treatment and prevention as well as continence care.

Recognizing a need in a particular population, our CWOCN implemented an initiative central to the ICU population. The project began in 2012 and required that all patients admitted to the ICU have Allevyn♦ Gentle Border placed on the sacrum immediately. The primary goal was to show a decrease in the incidence of sacral pressure ulcers in the ICU patient population. Initiation of this project was started with the expertise of our Certified Wound, Ostomy, Continence Nurses.

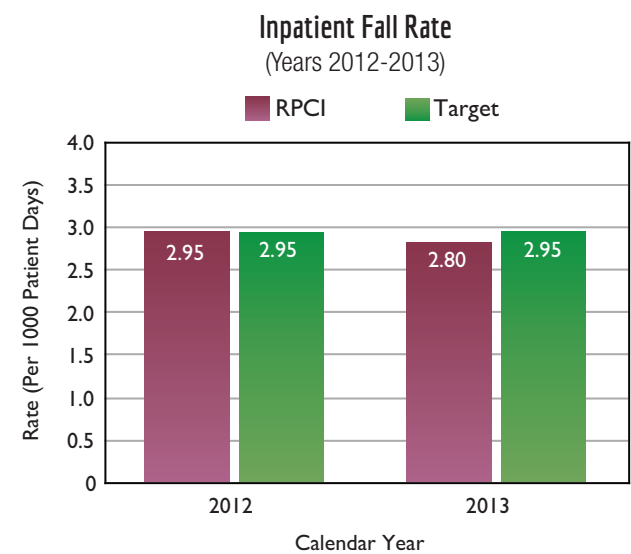
In addition, the project included making Allevyn♦ available to all inpatient units for reapplication of the dressing as necessary, as well as initiation when a patient showed particular risk for skin breakdown. This further illustrates the autonomy and expertise of our clinical nursing staff.



Falls Prevention Program

Every patient diagnosed with cancer, regardless of age, has a higher risk of falling. The goal of the Falls Prevention Program at Roswell Park is to identify the patient who is at risk of falling, reduce that risk and provide a safe environment. Several interventions to reduce patient falls have been implemented at Roswell Park. They include a signed safety agreement between patient and nursing staff; a fall risk assessment scale to determine low-, moderate-, and high-risk patients; safety interventions initiated based on risk category – for example, bed and chair alarms, door magnets, slipper socks with improved grips for all patients, yellow blankets for increased visual cue of patients with increased fall risk, and an educational brochure on preventing falls provided to each patient; and a multidisciplinary team huddle performed if a fall occurs.

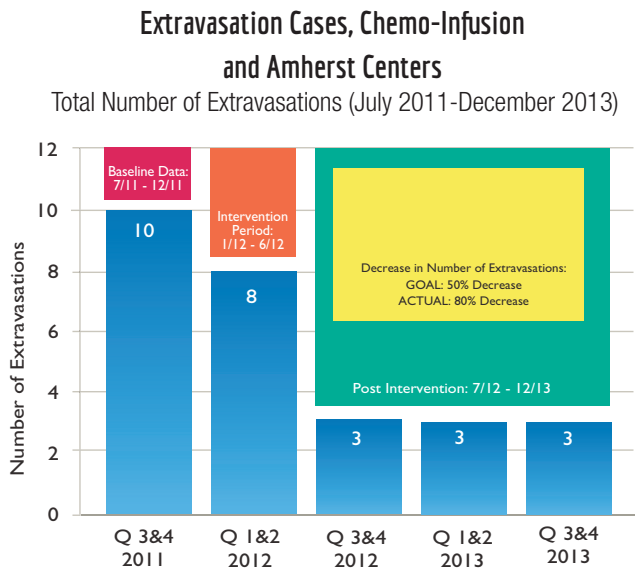
Our patient falls data reflects a downward trend from 2011 to 2013. The rate is measured by number of falls per 1,000 inpatient days. The goal is to have the rate lower than the target. We remain lower than the national oncology mean and continue to strive to get our rates even lower.



Extravasation Benchmarking Study

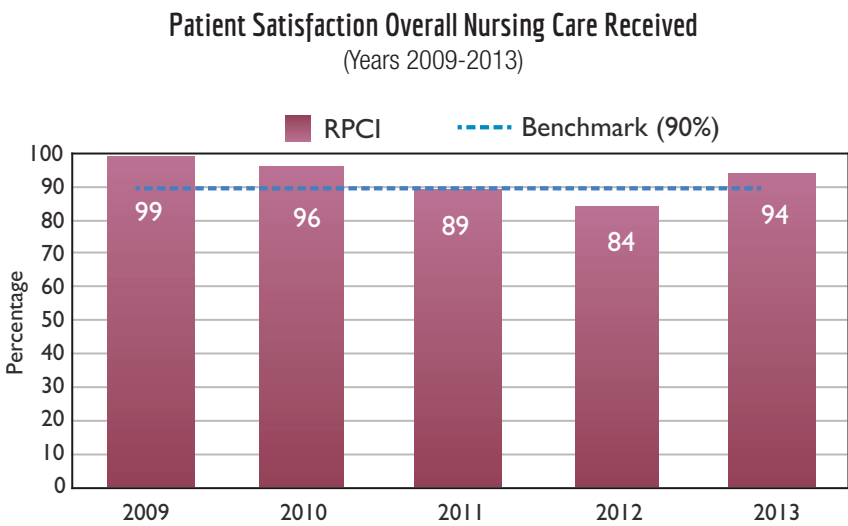
In 2011 a group of nursing quality specialists from 19 National Cancer Institute-designated comprehensive cancer centers organized to develop meaningful quality indicators in specialty areas. The group, known as C3NSI, a liaison from Oncology Nursing Society, and the National Database of Nursing Quality Indicators are collaborating on an extravasation benchmarking study to provide crucial information for outpatient settings on extravasation of chemotherapy. The initiative is led by Roswell Park Cancer Institute nurses and

an RPCI quality analyst and collects information for the study from all 19 C3NSI centers. A tool has been developed to track extravasations, and practice has changed to follow up with all extravasations post-appointment. We have seen a steady decline in extravasations with education and in-servicing, revision of policy, and evidence-based change in catheter size.



Patient Satisfaction with Overall Nursing Care

The Press Ganey Survey is an instrument that allows for the responses of our patients to be compared to those of patients at hundreds of other hospitals across the country. This helps identify areas of excellence for Roswell Park along with opportunities for us to improve the patient experience. The scores related to nursing care were compiled into one overall nursing care measure. This measure shows exemplary marks for the overall nursing care received at RPCI. Benchmark below is 90 percent.



PATHOLOGY & LABORATORY MEDICINE

Introduction

The Department of Pathology and Laboratory Medicine plays a central role in supporting the Institute’s mission of excellence in patient care, translational research, and medical education.

The mission of the department is to provide comprehensive clinical testing, research support, and diagnostic expertise in a manner that is in alignment with the Institute’s specific areas of focus and subspecialty disease site delivery model. Our efforts have been focused on providing services that match our patients’ specific needs, improving communication and integration of laboratory services within the delivery of clinical care, and providing area expertise that supports the research and education activities of the Institute.

The services provided are divided into the traditional disciplines of Anatomic Pathology, inclusive of Surgical Pathology, Cytopathology, Hematopathology, and Medical Pathology (Autopsy), Laboratory Medicine (Chemistry, Hematology, Immunology, Microbiology, and Transfusion Services), and specialized areas of Clinical Cytogenetics, Flow Cytometry, and Molecular Diagnostics. All areas are led by board-certified specialists with advanced fellowship training in their fields. The department performs 1.5 million tests annually.

Surgical Pathology

Surgical Pathology is structured as a modified subspecialty model with specific expertise in breast, gynecology, genitourinary, dermatopathology, thoracic, gastrointestinal, soft tissue sarcoma, head and neck, neuropathology, and hematopathology. All the Anatomic Pathology staff have completed at least one post-residency fellowship, many have completed two subspecialty fellowships, and most have subspecialty board certification. This highly specialized model integrates more completely with the subspecialized clinical care delivery model and provides for more integration of the clinical and research missions of the Institute. A seamless transfer of tissue samples from Anatomic Pathology to Molecular Diagnostics for genomic and biomarker profiling of a patient’s tumor assures patient access to the most advanced, personalized therapy available for their specific tumor. (See Center for Personalized Medicine.)

Cytopathology

The Cytopathology section is staffed by fellowship-trained, board-certified cytopathologists with specific expertise in cytopathology. A cytopathologist-performed fine-needle aspiration service provides rapid diagnosis for patients with superficial palpable masses. Cytology support to Diagnostic Imaging for rapid, on-site assessment for adequacy of image-guided tissue acquisition provides unique support to clinicians and ensures that patients are rarely required to undergo a second procedure to obtain a definitive tissue diagnosis.

Flow Cytometry

Flow Cytometry is a relatively new and sophisticated technology housed in a state-of-the-art facility at Roswell Park. The service offers simultaneous analysis of up to 12 different cell signatures at rates of 10,000 cells per second. It is routinely used by pathologists to evaluate clinical hematologic samples in support of the Leukemia, Lymphoma, and Blood & Marrow Transplant Services. The high speed and sensitivity of this technology allow for the routine detection of minimal residual disease, detecting one abnormal cell out of 100,000 white blood cells. Clinical results may be available within two hours for diagnosis of critically ill patients who require immediate therapy.

Clinical Cytogenetics

Clinical Cytogenetics offers conventional karyotyping as well as a full array of advanced molecular testing for precise classification of hematologic disease, identifying the specific molecular abnormalities that separate one type of hematologic disorder from closely related but different diseases. The Clinical Cytogenetics Laboratory is one of 106 worldwide reference testing sites for the Children’s Oncology Group (COG) and one of 33 US reference sites for the Alliance for Clinical Trials in Oncology (formerly the Cancer and Leukemia Group B), underscoring the expertise and quality of the Cytogenetics laboratory.

Laboratory Medicine

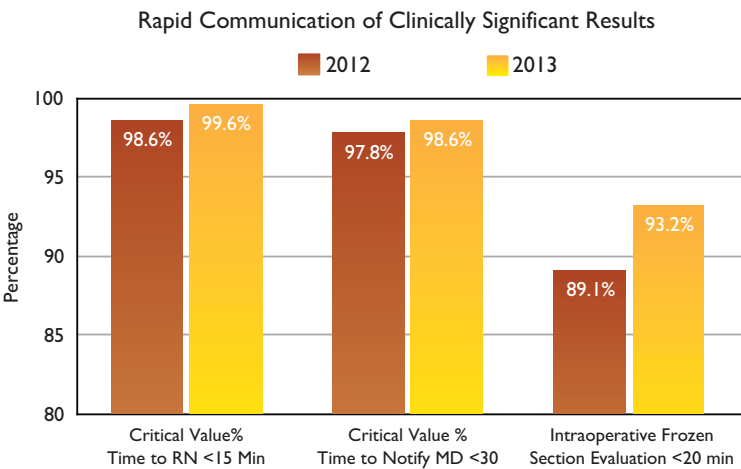
Laboratory Medicine provides traditional core laboratory services 24/7 in addition to the operation of satellite laboratories at Amherst and the Chemo/Infusion Clinic. The department houses the only hospital-based blood donor facility in the region. The Therapeutic Apheresis and Stem Cell Processing Laboratory directly support the BMT program with the collection and processing of hematopoietic progenitor cells for transplantation. Laboratory Medicine also offers CellSearch®, the circulating tumor cell assay, the most advanced methodology for detecting cancer cells in the blood of patients with metastatic breast, prostate, and colorectal carcinoma. Detection of circulating tumor cells allows the clinician to alter therapy quickly rather than waiting for changes in the size of a tumor as determined by radiographic imaging, which may not be evident for several months.

ADDITIONAL FACTS:

- The department has approved Accreditation Council for Graduate Medical Education fellowship programs in oncologic surgical pathology and cytopathology**
- A cytotechnology school leading to an MS degree will open in the fall of 2015 in collaboration with Daemen College.**
- The department supports clinical affiliations with several regional Clinical Laboratory Technologist, Clinical Laboratory Technician, and Phlebotomy programs.**

Rapid Communication of Clinically Significant Results

Approximately 80% of the data used to make clinical management decisions are generated by Pathology and Laboratory Medicine. It is imperative that rapid/prompt reporting of clinically significant results occur. The laboratory demonstrates that 98% of critical laboratory values are reported to the RN nursing location within 15 minutes and to the MD provider within 30 minutes. Rapid intraoperative consultation of frozen tissue evaluation is completed in less than 20 minutes for 93% of all cases.



| Rapid Communication of Clinically Significant Results | | | |
|---|-------------------------------------|--|--|
| Year | Critical Value % Time to RN <15 Min | Critical Value % Time to Notify MD <30 | Intraoperative Frozen Section Evaluation <20 min |
| 2012 | 98.6% | 97.8% | 89.1% |
| 2013 | 99.6% | 98.6% | 93.2% |

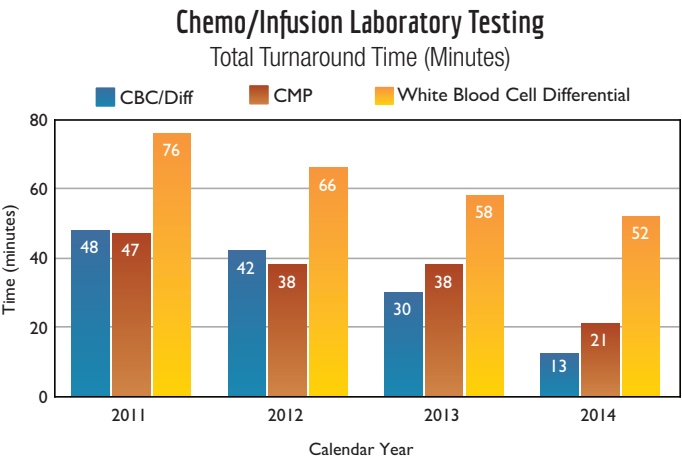
Rapid Evaluation of Patient Samples

The Surgical Pathology section of the department supports enhanced clinical care by rapid assessment of intraoperative frozen tissue sections. Rapid frozen section diagnosis and margin assessment allows surgeons to be more precise and complete in their surgical resections, enhancing patient care. The evaluation of clinically abnormal masses by fine-needle aspiration biopsy with rapid on-site assessment of specimen adequacy is provided by a team of cytopathologists and cytotechnologists. This rapid, on-site adequacy assessment method is well recognized and is known to increase patient and provider satisfaction, leading to fewer unsatisfactory diagnoses, and dramatically reduces the need for repeat procedures. The department will have a new Frozen Section suite and Cytopathology area located in close proximity to the operating room and within the Endoscopy Suite in the spring of 2015. This will facilitate a closer collaboration and enhance communication between surgeon/endoscopist and pathologist.

| Rapid Evaluation of Pathology/Cytology Material | | |
|---|--|---------------------------------------|
| Year | # of Intraoperative Frozen Section Evaluations | # Of Fine-Needle Aspirate Evaluations |
| 2012 | 3836 | 1517 |
| 2013 | 3781 | 1722 |

Chemo/Infusion Center Laboratory Testing Turnaround Time

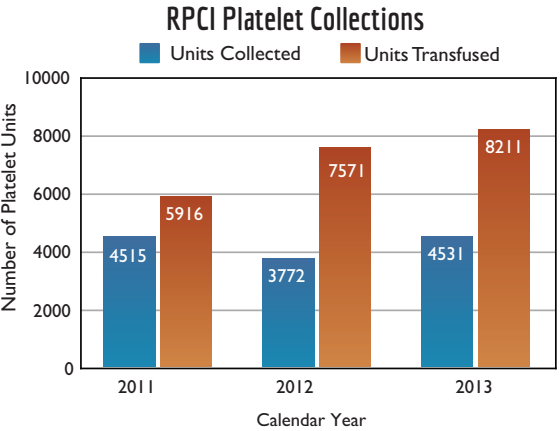
Patients undergoing chemotherapy/infusion treatments often require same-day laboratory testing to determine clinical eligibility for treatment. The laboratory testing time, combined with drug preparation and administration time, can result in patient visits that are several hours in length. The RPCI Core Laboratory has focused on process initiatives to reduce the laboratory testing timeline for these patients. The process improvements included revised order status (same day or advance), specimen triage, and the implementation of a satellite testing laboratory with dedicated phlebotomy coverage within the Chemo/Infusion Center.



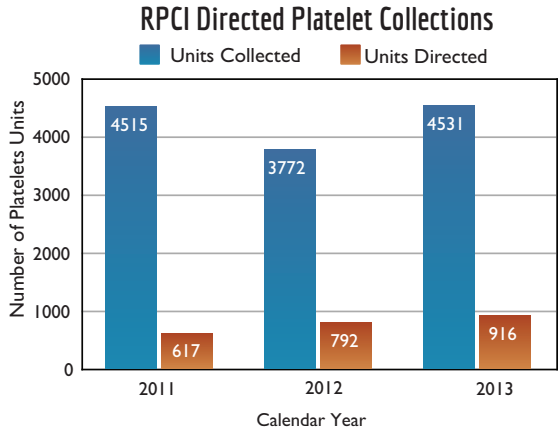
| Chemo/Infusion Laboratory Testing Turnaround time (minutes) | | | |
|---|----------|-----|-------------------------------|
| Year | CBC/Diff | CMP | White Blood Cell Differential |
| 2011 | 48 | 47 | 76 |
| 2012 | 42 | 38 | 66 |
| 2013 | 30 | 38 | 58 |
| 2014 | 13 | 21 | 52 |

The Donor Center at Roswell Park

Operating since 1964, the RPCI Donor Center is one of the oldest hospital-based blood-product collection facilities in the United States. The center is celebrating its 50th anniversary in 2014. It is the only regional blood product collection facility that supports a directed-donation program for platelets and red blood cells. This program provides the opportunity for a patient's family and friends to actively contribute to care with a directed donation. The local collection of platelet products is an important component of inventory management that ensures products are available when patients require them.



| RPCI Platelet Collections | | | |
|-------------------------------|------|------|------|
| | 2011 | 2012 | 2013 |
| # PLT units collected at RPCI | 4515 | 3772 | 4531 |
| # PLT Units Transfused | 5916 | 7571 | 8211 |
| % of Total Collected at RPCI | 76% | 50% | 55% |

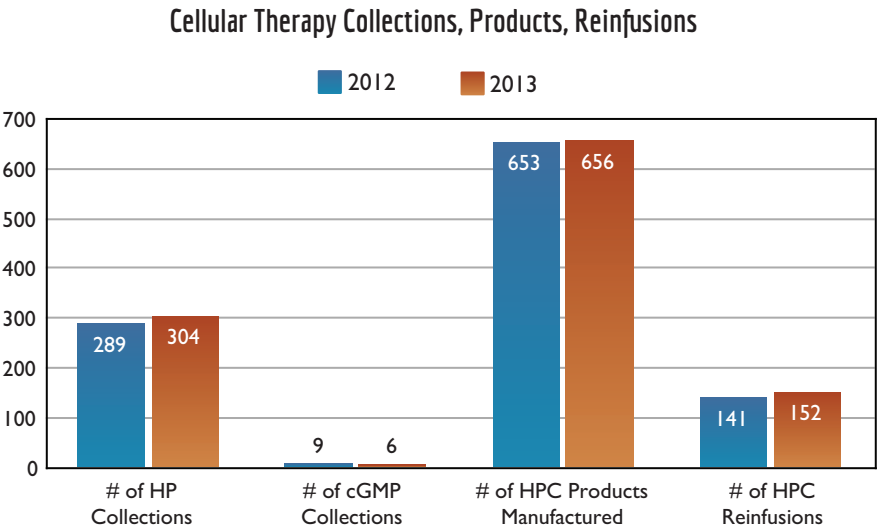


| RPCI Directed Platelet Collections | | | |
|------------------------------------|------|------|------|
| | 2011 | 2012 | 2013 |
| # PLT Units Collected at RPCI | 4515 | 3772 | 4531 |
| # of Directed PLT Units | 617 | 792 | 916 |
| % Directed Units Collected | 14% | 21% | 20% |

Laboratory Support of the Cellular Therapy Programs

The Therapeutic Apheresis Unit supports the Blood & Marrow Transplant Center (BMT) and Cellular Vaccine Therapy programs with the collection of cellular products utilizing apheresis technology. The majority of Human Progenitor Cells (HPC)/apheresis products collected on site support RPCI patient transplants. In addition, the unit is designated as a collection center for the National Marrow Donor Program.

The Stem Cell Processing Laboratory within the department supports the BMT program with the processing of HPC products collected in the Therapeutic Apheresis Unit and bone marrow harvests collected in the operating room. The processing activities of the area include the cryopreservation and storage of units for future transplant. In addition, the Stem Cell Laboratory prepares products for fresh reinfusion. This includes the intake of products collected at other centers via the NMDP program. The Stem Cell Laboratory staff are present at the recipient's bedside for the administration of thawed cryopreserved cells.

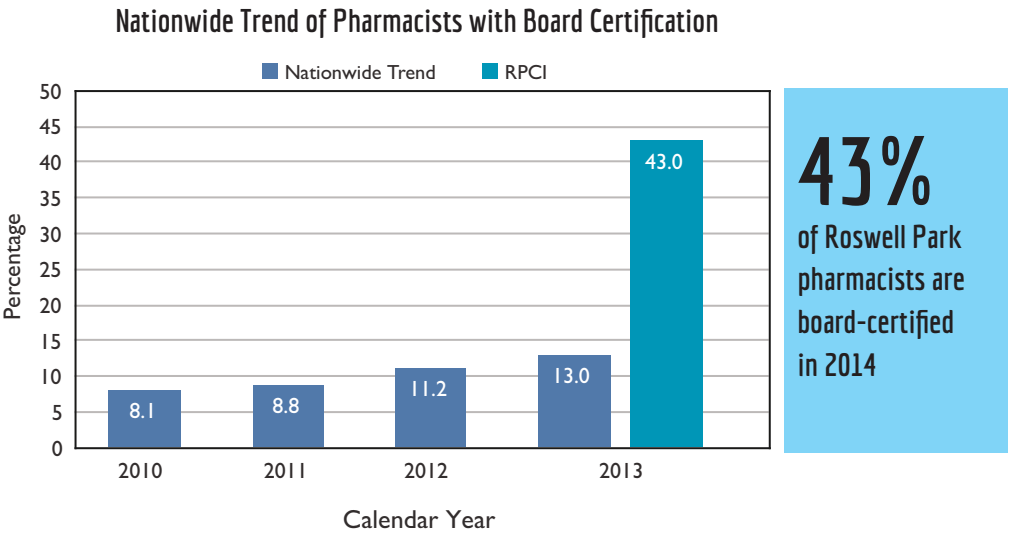


| Cellular Therapy Collections, Products, Reinfusions | | |
|---|------|------|
| | 2012 | 2013 |
| # of HPC Collections | 289 | 304 |
| # of cGMP collections | 9 | 6 |
| # of HPC Products Manufactured | 653 | 656 |
| # of HPC Reinfusions | 141 | 152 |

PHARMACY

The Department of Pharmacy at Roswell Park Cancer Institute plays a key role in the overall mission to understand, prevent and cure cancer. The Department of Pharmacy has a staff of more than 70 pharmacists, technicians, and support staff, who oversee more than \$75 million in annual drug expenses.

Its goal is to provide timely, high-quality pharmaceutical care to its patients, and to help manage the very complex pharmaceutical regimens followed by cancer patients. In order to manage such complex treatment regimens, the department has worked to recruit the highest-qualified talent available as resources to our staff and patients. The department offers evidence that the credentials of its pharmacy staff far exceeds national averages in terms of having pharmacists who have obtained board certification. Obtaining board certification as a pharmacist demonstrates the individual’s commitment to the profession.

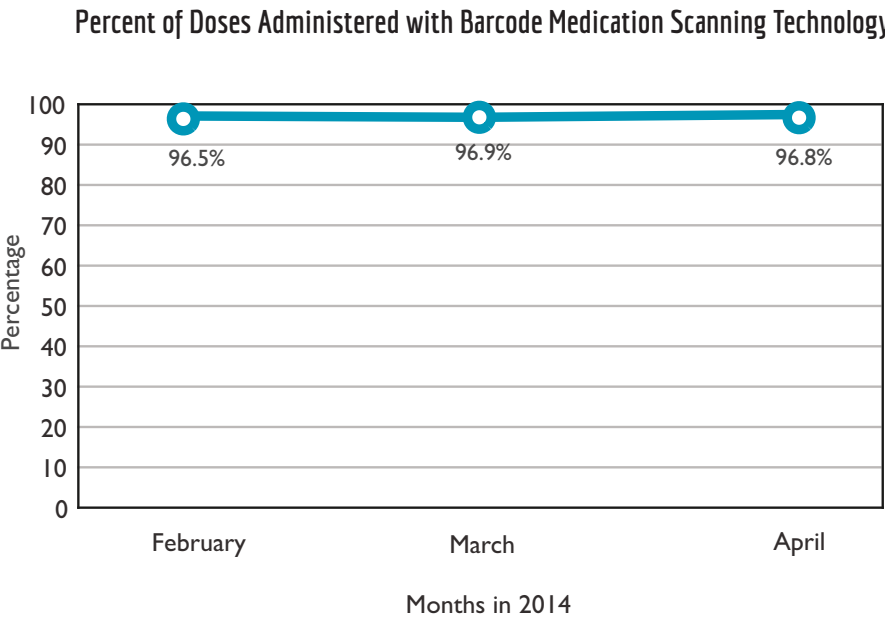


Adopted from ASHP Staffing Survey 2012

Pharmacy Commitment to Safety

Roswell Park Cancer Institute has a dedicated patient safety officer who is tasked with administrative oversight of the safe use of medications throughout the organization. In fact, RPCI pharmacists log 900 clinical interventions per month on average.

The Department of Pharmacy works closely with the Department of Nursing on joint initiatives to reduce the likelihood of medication errors. Barcode medication administration (BCMA) systems interface with the electronic medical record (EMR) to help ensure that the five rights of medication administration (the right patient, the right drug, the right dose, the right route and the right time) have been met before the nurse administers the medication to the patient. Barcode technology provides an additional accuracy check immediately prior to the medication administration, where previously there had been none (Bargren & Lu, 2009). It is, in essence, a second pair of eyes for the nurse.

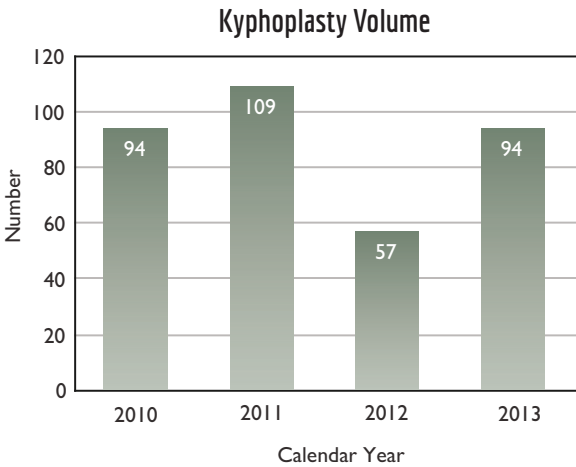
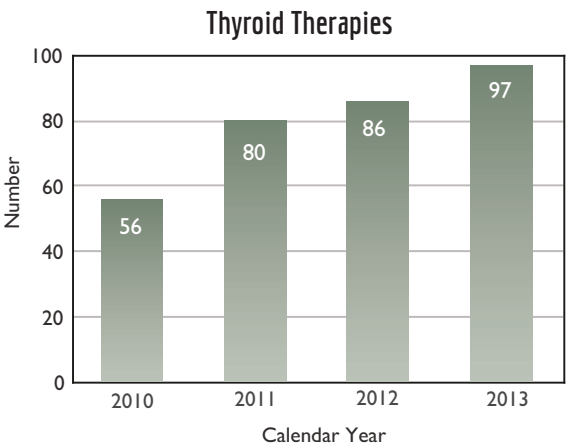
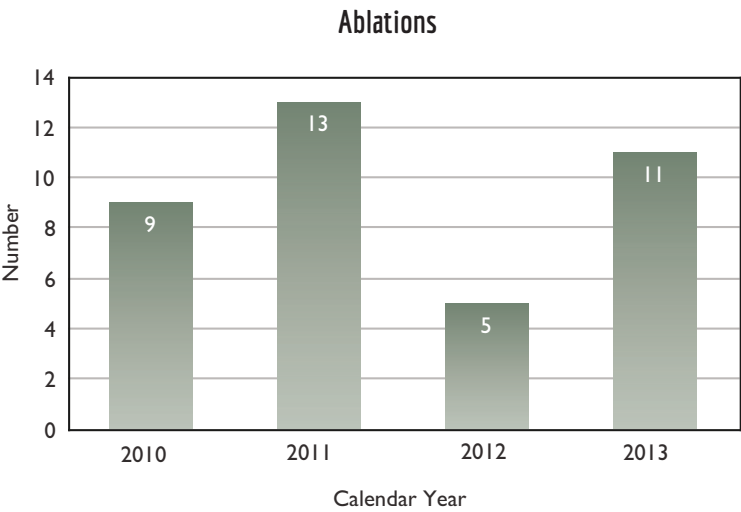


RADIOLOGY

The “value added” or “quality added” of diagnostic imaging at Roswell Park Cancer Institute is not readily apparent from a cursory analysis of the usual metrics: equipment quality, personnel training, and space. While our equipment is state-of-the-art and our staff are predominantly fellowship-trained, the quality added by Diagnostic Imaging at Roswell Park abides in a series of operational features that are unusual even in top cancer centers and top university hospitals, and unique to the Buffalo area.

INTERVENTIONAL

- 1. Roswell Park’s Radiology Department is aggressively interventional. We perform imaging-guided biopsies of virtually all tissues, from the skull base to the toes, in the Radiology Department, under conscious sedation, and we recover our patients in our own outpatient recovery suite. Although many hospital radiology departments now perform lung, liver, and thyroid biopsies, we emphasize larger-volume core biopsies to obtain adequate diagnostic samples. Moreover, all samples are examined at the time of removal by an on-site pathologist or cytopathologist in their lab in Radiology to ensure that adequate tissue is obtained. Thus, our callback rate for a repeat biopsy is under 2%.
- 2. The Radiology Department is also aggressively interventional in terms of therapy. Radiofrequency tumor ablation, microwave ablation, and cryoablation are available, depending upon tumor site and type. The department provides critical support for our Surgical Services Department, facilitating their ability to manage complex cases. In the Nuclear Medicine Department, we have by far the largest thyroid cancer therapy group in Western New York.



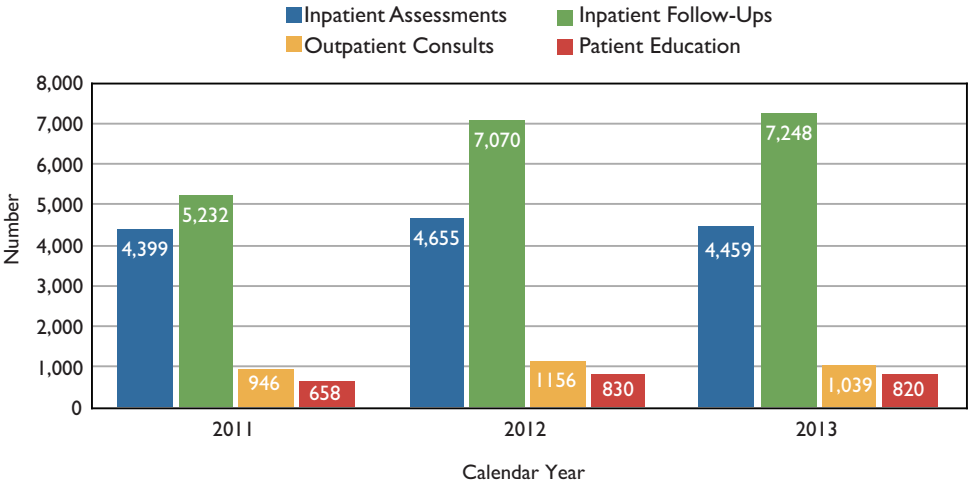
- 3. Interventional therapeutic procedures performed by neuroradiologists at RPCI include kyphoplasty and vertebroplasty; for patients with a cancer diagnosis, we have one of the largest series statewide.
- 4. We actively support the limb perfusion therapy service, and are key to the microembolization and radioembolization of hepatic metastases, which are performed in our department as a collaboration between Nuclear Medicine and Interventional Radiology.

DIAGNOSTIC

- 1. American College of Radiology standards recommend reporting of all cases, whenever possible, within 24 hours. We comply, and usually exceed this standard by reporting cases within the same “daylight cycle” – i.e., cases performed between midnight and 4 p.m. on any given day are reported by the end of that workday. Because we employ instant voice-recognition software, there is no delay for human transcription.
- 2. Once a patient arrives in our department, the typical waiting time before a procedure begins is less than 30 minutes. (Such a minimal wait can easily be achieved in a private office with a low patient load and an array of minor illnesses, but it is rare in a cancer center.)

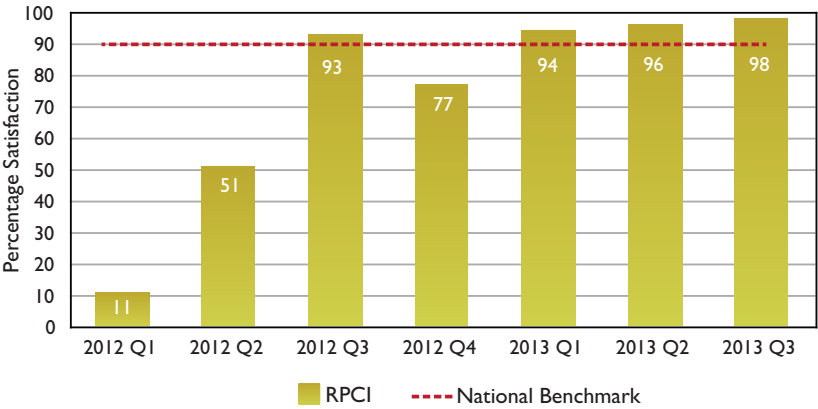
NUTRITION

The Roswell Park Nutrition and Food Service team is dedicated to providing nourishing meals and nutrition care to promote quality of life throughout the spectrum of the cancer care experience.

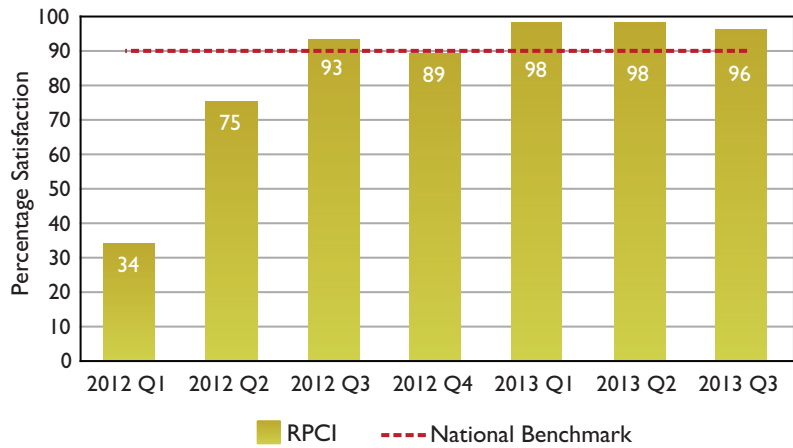


In 2012, Roswell Park Cancer Institute launched the Room Service program for patient meals. This hotel-style meal service replaced the traditional-style hospital food program where patients had to make their meal choices 24 hours in advance. Inpatients are now offered a menu with fresh food, cooked to order, and receive their meal within 30 minutes of ordering. From 7 a.m. to 7 p.m. daily, our patients can order what they want, when they want it. This innovative new program gives patients more flexibility and has drastically improved patient satisfaction, as shown on the following page.

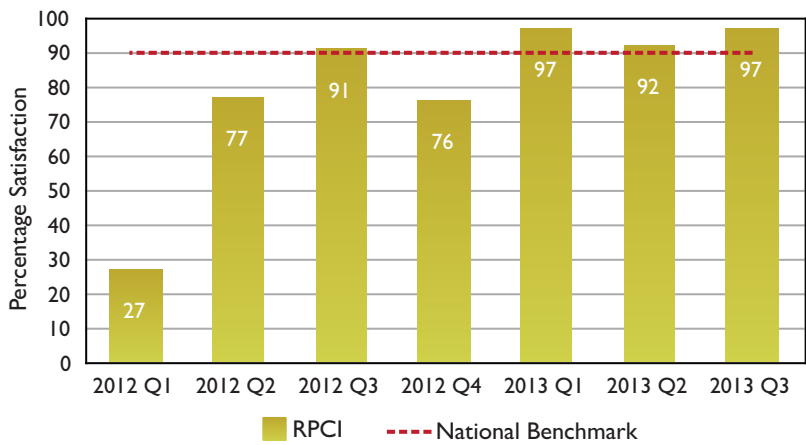
Patient Satisfaction with Courtesy of Person Who Served Food



Patient Satisfaction with the Temperature of the Food



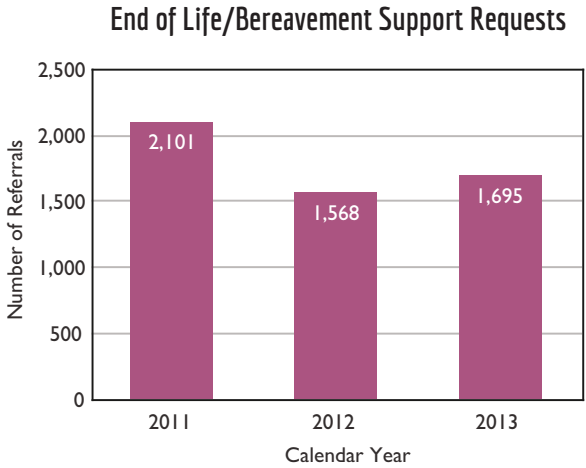
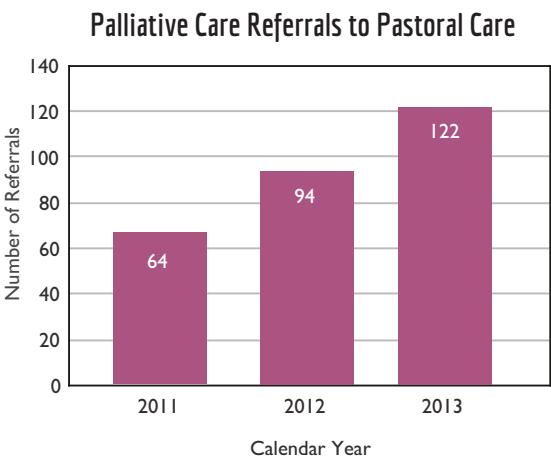
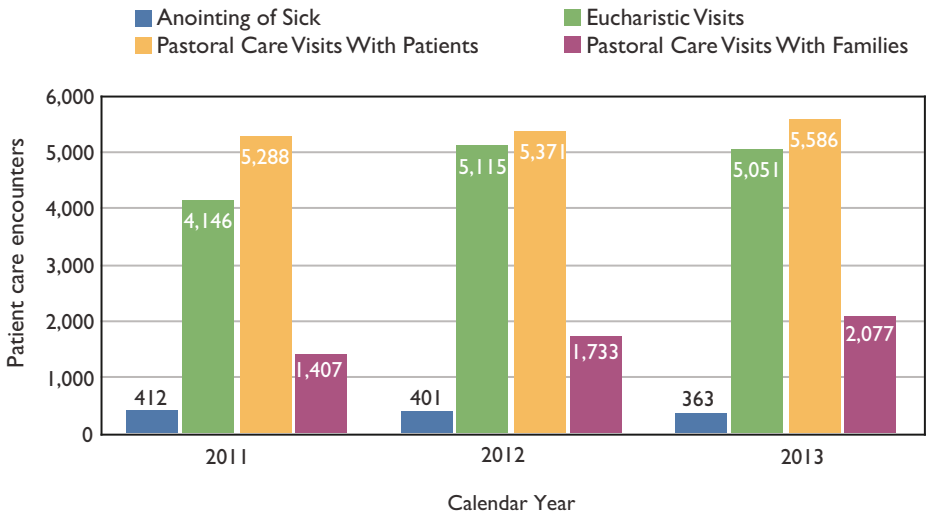
Patient Satisfaction with the Quality of the Food



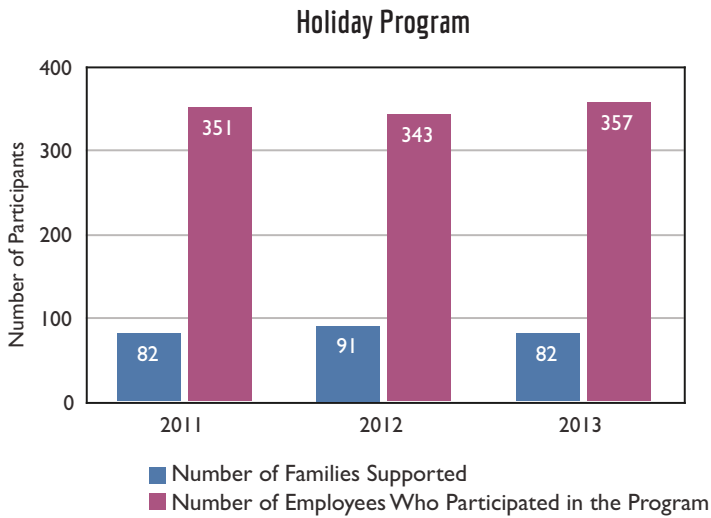
PASTORAL CARE

Pastoral Care

The Pastoral Care Department is an interfaith department supporting the concept of holistic medicine. The holistic approach recognizes the need to integrate the spiritual, emotional, social, psychological and physical care of the individual. Working collaboratively with other healthcare professionals, chaplains provide spiritual care and services to all patients and their families, upon request, regardless of religious affiliation.



Each December, the Pastoral Care Department coordinates an Institute-wide holiday program to provide holiday meals and gifts to patients and families who would benefit from additional support. Clinical, research and administrative RPCI departments participate in the program by sponsoring a family for the holidays.



REHABILITATION

Common side effects of cancer or its treatment include fatigue, pain, weakness, cognitive difficulties, anxiety or depression, and changes in self-esteem or self-image. Roswell Park provides a wealth of physical and occupational therapy services for patients on an inpatient and outpatient basis. Working with the multidisciplinary team, staff work to maximize the patient's physical abilities and comfort levels to ensure the quickest, most effective recovery.

On Average

- 57% of inpatients receive occupational therapy services.
- 75% of inpatients receive physical therapy services.
- 93.5% of inpatients are seen within one working day of referral.

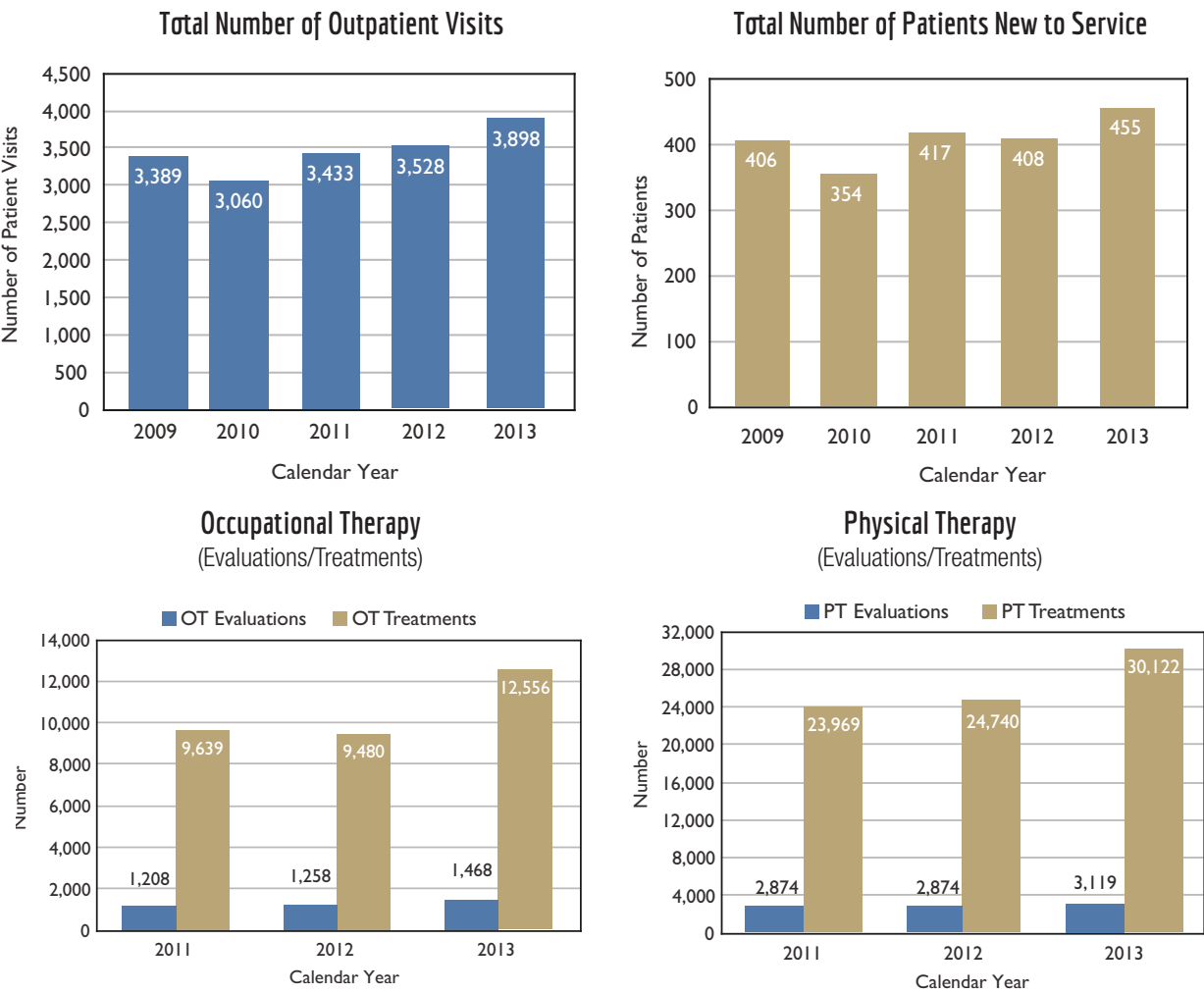
Occupational and physical therapists address these effects through interventions aimed at restoring function, such as:

- Developing exercise programs to improve strength and mobility
- Recommending appropriate home equipment so that patients can maximize safe function in the home
- Teaching individuals ways to conserve energy during important everyday activities
- Modifying environments such as the workplace, home, or community to improve safety and function
- Providing treatments aimed at reducing pain and restoring function.

Occupational therapists also provide lymphedema treatment to restore function and appearance of limbs following lymph node surgery or treatment.

Program statistics

New to Service Referrals and Total Outpatient Visits by Calendar Year for the Rehabilitation Department



Specialized rehabilitation treatments available at RPCI include:

- Lymphedema treatment
- Pelvic floor rehab following prostate surgery
- Pre-blood or- marrow transplant evaluation and conditioning
- Postoperative breast surgery rehabilitation
- Fatigue management

Lymphedema

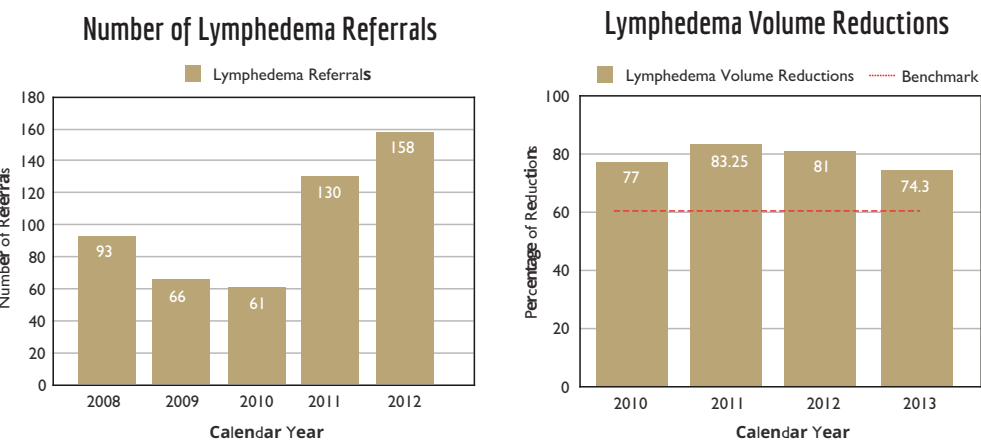
Lymphedema is an abnormal collection of protein-rich fluid that causes chronic inflammation and reactive fibrosis of affected tissues. It presents as swelling (commonly in the limbs), skin changes, discomfort, or restricted motion. Anyone who has had gynecological, prostate, breast, or kidney cancer or melanoma in combination with lymph node dissection or radiation is at risk.

Comprehensive treatment includes:

- Manual lymphatic drainage
- Compression bandaging
- Lymphedema-specific exercises
- Meticulous skin and nail care
- Instructions in self-care

This specialized treatment is offered through the Occupational Therapy Department by a certified lymphedema specialist.

Volumes and outcomes



Postoperative Breast Surgery Rehabilitation

Surgery to remove lymph nodes in the armpit (axilla) is a key part of the treatment of breast cancer and melanoma. Stiffness of the shoulder immediately after surgery; numbness; pain in the armpit or arm; and edema are potential side effects. Exercise after surgery is key to limiting the side effects of surgery and regaining full motion and activity of the involved arm. Our experienced physical therapists provide evaluations and treatments to guide the patient to recovery. Although patients can choose to go to a therapist in the community, many prefer the experienced staff at Roswell.

Fatigue

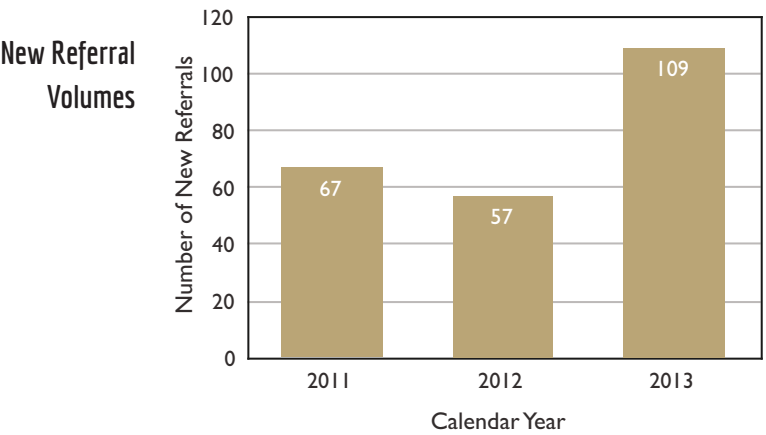
Fatigue is one of the most common side effects of cancer and its treatment. In collaboration with a multidisciplinary team, including staff from Occupational Therapy, Nutrition, and Psychosocial Oncology, and with a grant from the Roswell Park Alliance Foundation, an informational DVD was developed to educate patients on management of cancer-related fatigue. Through referral from clinics, patients with symptoms of fatigue are identified and are sent a copy of the DVD. Patients are then invited to contact the Rehabilitation Department for a one-on-one session with an occupational therapist for further individualized instructions, if desired.

Blood and Marrow Transplant

Blood and marrow transplants place physical demands on the individual. Prior to admission for a transplant, candidates are seen by a physical therapist for an evaluation to determine if their physical performance is at an appropriate level to tolerate the demands of transplant. If candidates are not at a level of physical condition deemed appropriate to move forward with transplant, they are referred for outpatient physical therapy to build strength and stamina. Over 90% of patients referred for physical therapy prior to transplant for conditioning, proceed on to transplant. Once patients are admitted to the hospital for their transplant, the rehabilitation team works with them regularly to keep muscles strong and promote patient independence to prepare for discharge. There is evidence to support exercise as a mechanism to improve white blood cell counts—an important indicator in recovery post-transplant.

Pelvic Floor Rehab

A common side effect of a prostatectomy is urinary incontinence. It is also a potentially treatable condition with the right tools. Men who have had a robot-assisted prostatectomy are referred to Physical Therapy to learn about the role of the pelvic floor muscles in controlling urinary continence. Patients are instructed in exercises and activities that can improve pelvic floor strength and coordination to control urinary flow throughout the day and night. Our specially trained therapists note that approximately 99% of the time, patients are doing Kegel exercises incorrectly. Once it is learned correctly, patients find it helpful in regaining urinary control. RPCI patients have been able to achieve social continence in 3-4 visits with the therapist.



PALLIATIVE CARE

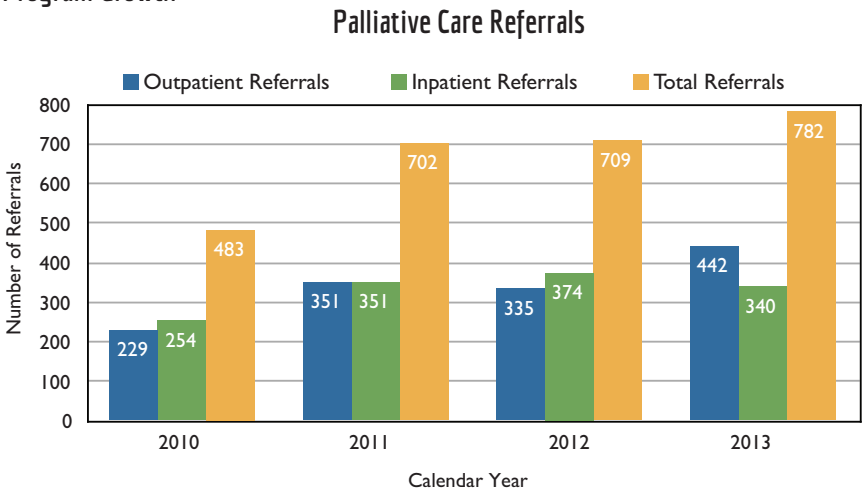
The mission of the Supportive & Palliative Care Team at Roswell Park Cancer Institute is to prevent and treat physical, psychosocial and/or spiritual suffering and to enhance quality of life for all patients and their loved ones. This team is comprised of palliative care doctors, nurse practitioners and nurses who work in concert with Social Work, Psychology and Pastoral Care to give the patient and family multidisciplinary care for whatever treatment path they choose.

In 2012 RPCI was the 18th facility in the United States to gain the Joint Commission Advanced Certification for Palliative Care. At the present time, only 65 centers nationwide have achieved that honor. (www.QualityCheck.org/CertificationList.aspx)

According to The Joint Commission, this “is designed to recognize hospital inpatient programs that demonstrate exceptional patient- and family-centered care in order to optimize the quality of life for patients with serious illnesses.” RPCI maintained the certification with another site visit in 2014.

In addition, the Veterans Health Administration (VHA Inc.) recognized the achievement through their Blue-print series, which is a way to share practices with all of their member hospitals in the mid-Atlantic region.

Program Growth

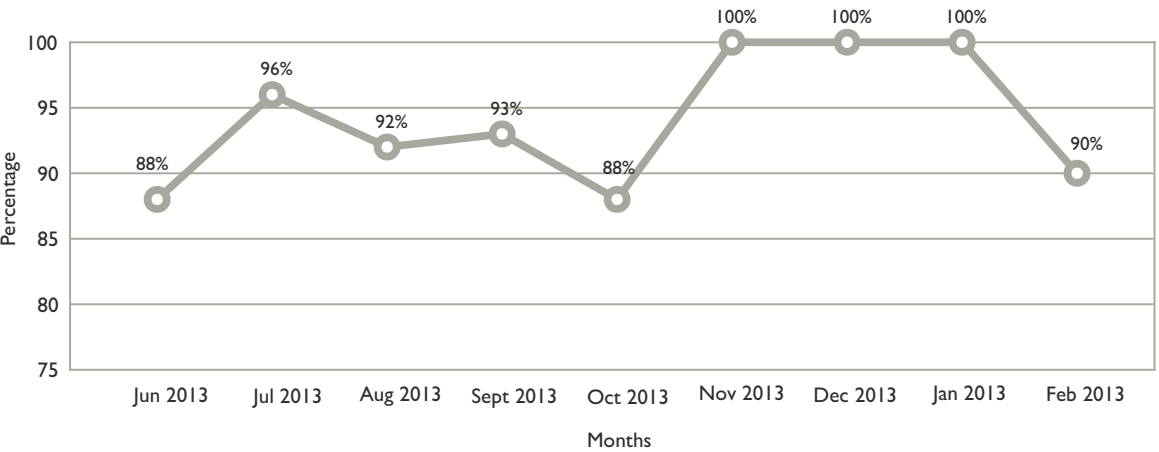


Supportive and Palliative Care referrals have increased 62% from 2010-2013. This reflects the integration of this new program into RPCI.

Quality Measures

As a result of the Joint Commission certification, the Palliative Care team must submit four measures for Quality Improvement. This is one: the Supportive and Palliative Care Team meets weekly to review patient cases and document the plan of care going forward. This ensures that the patient's wishes are clearly documented in the EMR by the Supportive and Palliative Care team for all disciplines to see.

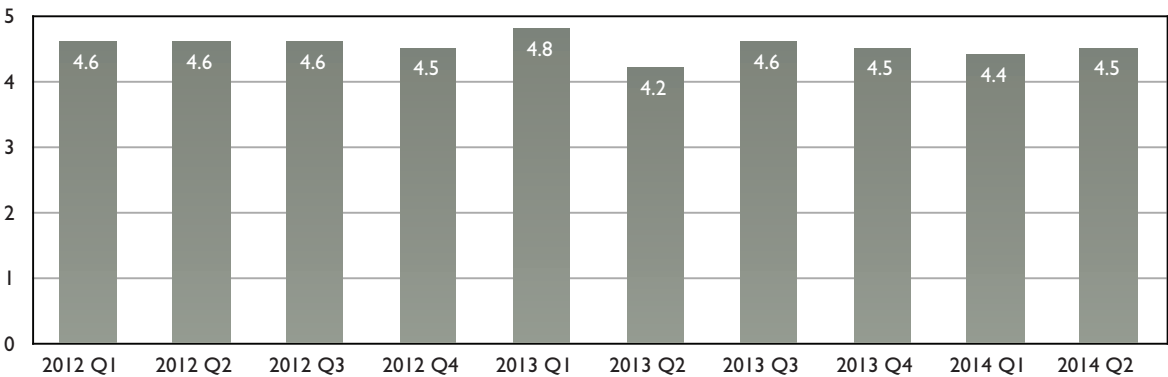
Wishes For Care Documented in Interdisciplinary Team Note



Patient Satisfaction

The Supportive and Palliative Care team conducts its own patient-satisfaction surveys, which show consistent high marks for the past two and a half years.

Overall Satisfaction with Supportive and Palliative Care (0-5 scale)



RPCI Clinical Faculty

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| Ian Cohen, MD, FCCP, FCCM | Mark Lema, MD, PhD | Raymond Sroka, MD |
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| Ananda Dharshan, MD | Elizabeth Mahoney, MD | Thomas Yannios, MD |
| Julia Faller, DO | Renee Mapes, MD | Anthony Yarussi, MD |
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| Bonnie Gleason, MD, FACP | Kathleen O'Leary, MD | |

Department of Dermatology

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Department of Diagnostic Radiology

Including: Body Imaging, Neuroradiology, Head and Neck, Angio/Interventional Radiology, Mammography, Nuclear Medicine

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| Ahmed Belal, MD | Alan Klitzke, MD, FACNM | Michael Petroziello, MD |
| Ermelinda Bonaccio, MD | Prasanna R. G. Kumar, MD | Charles Lawrence Roche, MD |
| Marinos Drakopoulos, MD | Thomas Laudico, DO | Samuel S'Doia, MD |
| Zachary Grossman, MD, FACR | Dominick Lamonica, MD | Sadashiv Shenoy, MD |
| Lalit Gurtoo, MD | Peter Loud, MD | Roger Smith Jr., MD |
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| Steven Herman, MD | Janine Milligan, MD | |

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| Peter Frederick, MD, FACOG | Emese Zsiros, MD, PhD, FACOG |
| Shashikant B. Lele, MD, FACOG | |

Department of Head & Neck Surgery/Plastic and Reconstructive Surgery/Dentistry & Maxillofacial Prosthetics

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| Hassan Arshad, MD | Moni Abraham Kuriakose, MD, FDSRCS, FFDRCS, FRCS Ed, FRCS, BDS | Cemile Nurdan Ozturk, MD |
| David M. Casey, DDS | Anthony Lister, DDS | Paul I. Tomljanovich, MD |
| David Cohan, MD | Robert F. Lohman, MD, MBA | Philip Williams, DDS |
| Vishal Gupta, MD | | |
| Michael Hess, DDS | Wong Moon, MD, FACS | |

Department of Medicine

Including: Blood and Marrow Transplant Program, Leukemia Section, Lymphoma/Myeloma Section

| | | |
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| Hussein Ali-Ahmad, MD | Sarah Holstein, MD, PhD | Sadat Ozair, MD |
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| Abdul Hamid Alraiyes, MD | Cyrus Irani, MD | Maureen Ross, MD, PhD |
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